STATE OF CALIFORNIA

The Resources Agency

Department of Water Resources

Northern District

WASTE WATER IN THE NORTHERN DISTRICT

Its Treatment, Quality and Use

Office Report

JUNE 1967

RONALD REAGAN
Governor
State of California

WILLIAM R. GIANELLI
Director
Department of Water Resources

FOREWORD

In recent years a trend toward full utilization of the resources of the State has developed as a result of the rapid growth in population. One means toward this end is the full use of existing supplies. To fully meet the ever-increasing demand for water, it is imperative that secondary use or reuse of existing supplies be made. One practical method of providing supplemental water is the reclaiming of water from waste water treatment facilities.

To fully utilize all available water resources in an area, water quality management is an essential consideration. If water from waste water treatment facilities is to be reclaimed for additional beneficial uses, its mineral quality as well as sanitary quality is a most significant factor.

California Water Code, Section 230, directs the Department of Water Resources to "... conduct surveys and investigations relating to the reclamation of water from sewage and industrial wastes for beneficial uses..." and to report the findings to the Legislature and the appropriate regional water quality control boards.

The Bulletin No. 68 Series, "Reclamation of Water from Sewage and Industrial Wastes", summarizes the data collected and has essentially filled the reporting requirement under Section 230. However, a great amount of detailed background information on sewage treatment and disposal systems has been accumulated. This information, covering systems in the Department's Northern District, is here presented in such a form as to be readily usable by the Department and others.

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

RONALD REAGAN, Governor, State of California
WILLIAM R. GIANELLI, Director, Department of Water Resources
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NORTHERN DISTRICT

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Chapter III is composed of descriptions, graphics and tables concerning the 22 facilities studied. Page numbers of the individual items are listed below. Blanks indicate items not available.

APPENDIXES

ACKNOWLEDGEMENT

The Northern District of the Department of Water Resources gratefully acknowledges the information furnished by the many public and private agencies and contained in this report. These contributions have been many and varied and have extended from 1956 until April 1967.

The cooperation of the numerous municipalities and other entities whose facilities are herein reported, of the Bureau of Sanitary Engineering, State Department of Public Health, and of the three Regional Water Quality Control Boards concerned, has all been of great assistance. The time and effort expended by the many plant superintendants and operators and other individuals who have in various ways assisted District personnel in the compilation and verification of these data are greatly appreciated.

CHAPTER I. INTRODUCTION

Need for Report

For a number of years the Department has been collecting reference and background information on waste water treatment facilities. This includes information relative to waste water treatment, water quality, waste quantities, and beneficial uses that are being or can be made of treated waste water. Most of this material has been developed in the studies leading to the Bulletin No. 68 series under Water Code Section 230, or in the course of special investigations related to waste water quality. Several other statutory requirements demand similar activities through which data are collected.

Persons considering reuse of waste water, but lacking specific data as to the quantity and quality of a possible source, are often unable to judge the suitability of the source. In addition to the requests of others, frequent needs within the Department to refer to these basic data have shown the necessity for assembling this unpublished material in a readily usable form.

When distributed and used, this information on sewerage systems and their effluents in the Northern District should contribute materially toward solution of the growing water requirements of the area and of the State as a whole. Some of the specific obvious benefits which will result from its circulation are:

1. To aid in determination of waste water use potential, and indicate possible sources of supply to meet new and expanding needs on a permanent or temporary basis,

2. To help identify possible problems of various types related to waste disposal, and prevent deterioration of surface and ground water sources,

3. To facilitate study and exchange of information and promote mutual assistance between agencies, and

4. To minimize duplication of effort in collection of data on waste water treatment, reuse, etc.

As will become evident to the reader, there are some areas where the data are incomplete. As funds are made available, ensuing office reports will be prepared to provide a more complete compilation of pertinent facts relating to the reclaiming and reutilization of treated waste water in the Northern District.

Organization of Material

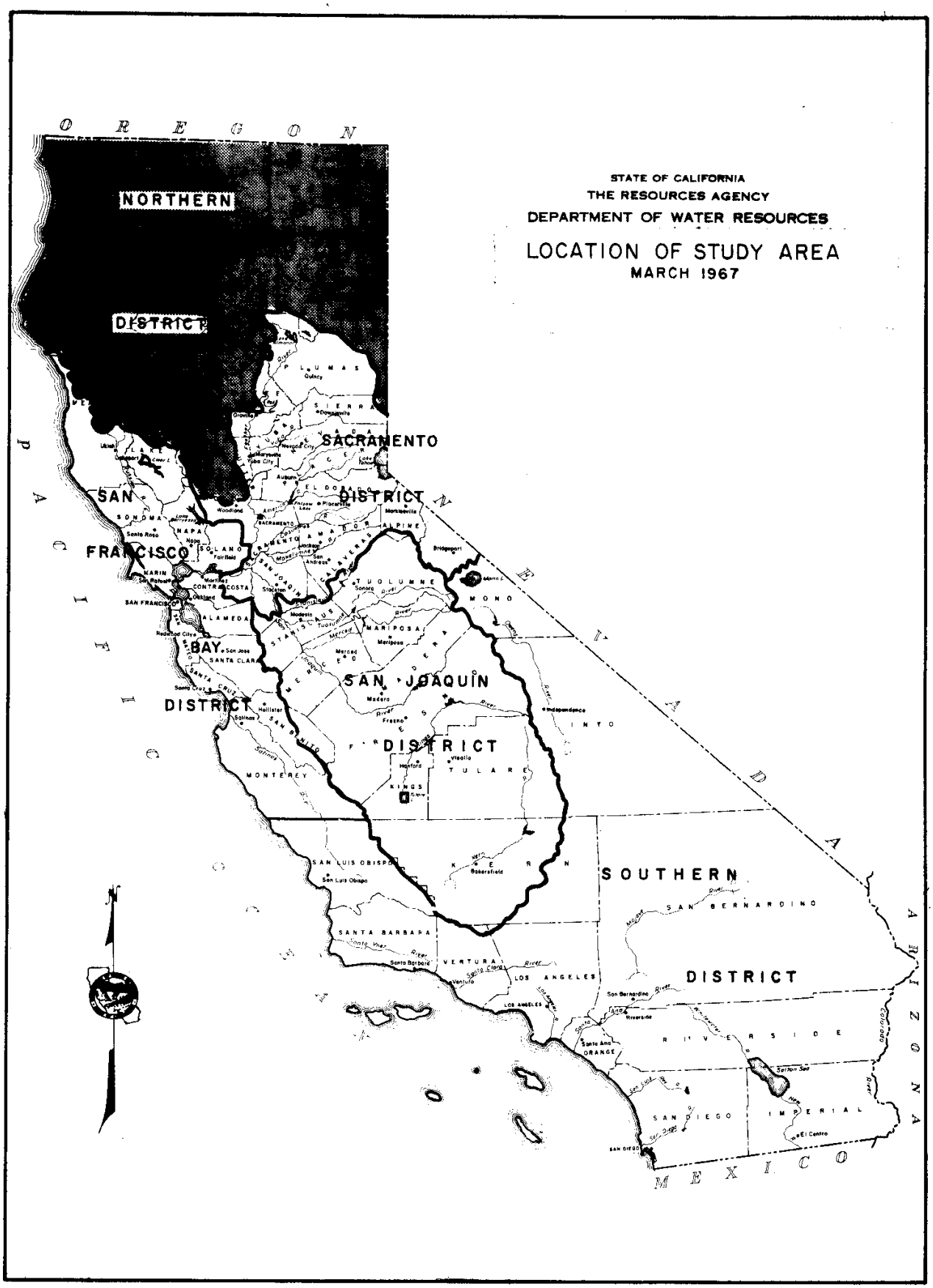
Chapter I of this report contains information to acquaint the reader with the report, the area covered, the nature of the study, and terminology.

Chapters II and III present summarized and detailed information about the 22 waste water treatment systems studied.

Chapter II summarizes the detailed data presented in Chapter III. Tabulated summaries for the various facilities are (1) "Sewage Treatment Facilities - General Information", (2) "Comparison of Supply Waters and Treated Effluents", and (3) "Disposal and Use of Treated Waste Waters".

Chapter III presents specific data about 22 selected facilities which discharge waste waters from communities within the area. These facilities are those of significant size for which sufficient data are

available. The data on each facility include a verbal description of the community and the facility with pertinent information about the effluent, a schematic diagram, and other graphic and tabulated data. The quantity of material depends in each case upon the data available.


STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
LOCATION OF STUDY AREA
MARCH 1967
OREGON
NORTHERN
DISTRICT
SACRAMENTO
DISTRICT
SAN
FRANCISCO
BAY
DISTRICT
SAN JOAQUIN
DISTRICT
SOUTHERN
DISTRICT
NEVADA
ARIZONA
MEXICO
PACIFIC OCEAN

Area of Study

This report presents data on 22 waste water treatment systems in the Department's Northern District. This District encompases all or nearly all of ten counties and lesser portions of 6 others, as shown on the map "Location of Study Area", Page 4. The area covered is approximately one-fourth of the whole State. It includes most of the North Coastal, Sacramento River Basin, and North Lahontan areas, constituting the northern portions of Water Quality Control Board Regions 1, 5 and 6.

A wide variety of geographic, climatic and hydrologic conditions are present within the District. The area is mostly mountainous and sparsely populated. Most residents of the area live in the valleys and along the coast, and mainly in communities ranging from a few families to nearly 30,000 persons.

Because of the great variety of physical conditions, the diversity of activities and the areal distribution of the population, the per capita use of water and other factors relating to reclamation of waste water vary widely from place to place.


OREGON
DEL NORTE
Crescent City
Klamath River
Yreka
SISKIYOU
Clear L.
Goose L.
MODOC
Alturas
Weed
Mt Shasta
Dunsmuir
River
HUMBOLDT
Trinity
Trinity Res.
Shasta Res.
Pit
Arcata
Eureka
Fortuna
Scotia
TRINITY
SHASTA
Redding
LASSEN
Eagle L.
Anderson
Susanville
California Conservation Center
Herlong
Eel River
TEHAMA
Red Bluff
Lake Almanor
Feather River
Corning
Sacramento
PLUMAS
Quincy
Orland
BUTTE
Chico
MENDOCINO
GLENN
Willits
Willows
SIERRA
Downieville
Oroville
YUBA
NEVADA
Colusa
Ukiah
LAKE
Lakeport
Clear L.
COLUSA
Yuba
Nevada City
Marysville
Yuba City
SUTTER
Lake Tahoe
PLACER
Auburn
Russian R.
EL DORADO
YOLO
Woodland
American R.
Folsom Res.
Placerville
SONOMA
Lake Berryessa
SACRAMENTO
Santa Rosa
NAPA
Napa
SOLANO
Fairfield
Cosumnes R.
SACRAMENTO
PACIFIC OCEAN
MARIN
San Rafael
Martinez
CONTRA COSTA
Oakland
SAN FRANCISCO
ALAMEDA
SAN MATEO
Redwood City
LEGEND
SEWAGE TREATMENT PLANT
NORTHERN DISTRICT BOUNDARY
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN DISTRICT
LOCATION
OF
SEWAGE TREATMENT PLANTS
1966

Definitions

Aeration - A process of introducing air into waste water during treatment.

Barminution - A particular form of comminution.

Beneficial Use - Use of water which is productive of public benefit, and which promotes the peace, health, safety, and welfare of persons using the water.

Clarification - A process in waste water treatment whereby the waters are made clearer through extraction of settlable and floatable substances.

Comminution - The process of pulverizing solids, making them more amenable to treatment.

Detrition - The process of removing readily settlable material.

Drinking Water Standards - Refer to the United States Department of Health, Education and Welfare, Public Health Service, Drinking Water Standards, 1962. (See Appendix A; page 189).

Filtration - A process of passing waste water through a media, sand or rock, to remove undesirable organics.

Oxidation Pond - A pond designed for treatment of organic wastes in which wastes are chemically combined with oxygen by biochemical activity and contact with air.

Percolation Pond - A pond designed to dispose of water through infiltration and percolation to the ground. These ponds often also serve as oxidation ponds.

Reclamation - The process of obtaining a water suitable for a beneficial use from a waste water.

Stabilization--The conversion of wastes from an unstable condition with a high oxidation demand to a steadfast, less objectionable condition.

CHAPTER II. SUMMARY OF DATA

The three tables included in this chapter require only brief explanation. Each table brings together certain similar data for all 22 sewage treatment facilities reported in detail in Chapter III.

Table 1, "Sewage Treatment Facilities - General Information", lists, for each facility, the population served, information concerning the operating entity, the county and Water Quality Control Board having responsibility in each community.

Regional Water Quality Control Boards have responsibility for establishing water quality control policy and control of all sources of pollution including both sewage and industrial waste discharges within their respective regions. The regions involved in the Northern District and mentioned in Table 1 are:

Board No.	Region
1	North Coastal
5	Central Valley
6	Lahontan

Table 2, "Comparison of Supply Waters and Treated Effluents", is a brief summary of chemical analyses of treated waste and supply waters. The table lists, in parts per million, the quantities of certain critical constituents, total dissolved solids and total hardness of both treated and supply waters, where known. Where analyses of both treated and supply waters are available, the change is indicated. This table is an abbreviated and comparative presentation of detailed data given in Chapter III for each community.

Table 3, "Disposal and Use of Treated Waste Waters", is essentially a summary of information concerning the present means of disposal and use of the final effluents from the 22 facilities. The quantities discharged, as well as the water bodies receiving the discharges, are listed. Existing intentional beneficial uses and proposed uses are also indicated.

SEWAGE TREATMENT FACILITIES.- GENERAL INFORMATION

Community	Treatment Plant Operator		Population Served	County	Water Quality Control Board
	Entity	Office in Charge			
Alturas	City	Director of Public Works	2,900	Modoc	No. 5
Anderson	City	Director of Public Works	6,050	Shasta	No. 5
Arcata	City	Director of Public Works	7,400	Humboldt	No. 1
California Conservation Center	State of California a/	Water & Sewage Plant Superintendent	1,200	Lassen	No. 6
Chico	City	Director of Public Works	18,900	Butte	No. 5
Colusa	City	Water Works Supr.	3,800	Colusa	No. 5
Corning	City	Director of Public Works	3,500	Tehama	No. 5
Crescent City	City	Public Works Director	3,000	Del Norte	No. 1
Dunsmuir	City	Supr. of Public Works	1,500	Siskiyou	No. 5
Eureka	City	Director of Public Works	15,000	Humboldt	No. 1
Fortuna	Town	Director of Public Works	3,800	Humboldt	No. 1
Herlong	U. S. Army, Sierra Army Depot	Chief of Utilities	1,500	Lassen	No. 6
Mt. Shasta	Town	Director of Public Works	2,500	Siskiyou	No. 5
Orland	City	Director of Public Works	3,000	Glenn	No. 5
Red Bluff	City	Director of Public Works	8,000	Tehama	No. 5
Redding	City	Engineer	16,000	Shasta	No. 5
Scotia	Pacific Lumber Co.	Chief Engineer	1,200	Humboldt	No. 1
Susanville	Susanville Consolidated Sanitary District	Engineer	7,000	Lassen	No. 6
Weed	Shastina Sanitary Dist.	Plant Superintendent	2,200	Siskiyou	No. 5
Willits	City	Director of Public Works	3,500	Mendocino	No. 1
Willows	City	City Manager	4,500	Glenn	No. 5
Yreka	Town	Director of Public Works	5,200	Siskiyou	No. 1

a/ Departments of Conservation and Corrections

TABLE 2
COMPARISON OF SUPPLY WATERS AND TREATED EFFLUENTS
MINERAL ANALYSES

(In parts per million*)

COMMUNITY	Source of Water Supply	Effluent Sample Date	SODIUM (Na)			SULPHATE (SO_4)			CHLORIDE (Cl)			TOTAL DISSOLVED SOLIDS			TOTAL HARDNESS		
			Supply Water	Treated Effluent	Change	Supply Water	Treated Effluent	Change	Supply Water	Treated Effluent	Change	Supply Water	Treated Effluent	Change	Supply Water	Treated Effluent	Change
Alturas	Wells	6-5-63	27	96	69	21	87	66	12	55	43	283	596	313	121	203	82
Anderson	Wells	1-30-64	11	43	32	5	13	8	3	20	17	108	274	166	48	90	42
Arcata	Creeks and Wells	6-14-61	--	118	--	4	31	27	10	162	152	171	471	300	122	130	8
Calif. Conserv. Center	Wells	6-5-63	--	94	--	--	22	--	--	33	--	---	422	---	---	31	--
Chico	Wells	7-21-60	13	44	31	6	10	4	10	32	22	200	241	41	125	75	-50
Colusa	Wells	1-31-64	84	129	45	11	5.3	-6	35	44	9	358	448	90	58	68	10
Corning	Wells	5-27-63	15	37	22	12	20	8	6	55	49	174	311	137	112	109	-3
Crescent City	Smith River	5-10-61	3	45	42	3	14	11	3	47	44	78	191	113	62	82	20
Dunsmuir	Springs	6-12-63	7	15	8	<1	6.4	6	<1	11	10	110	146	36	36	53	17
Eureka	Mad River	6-13-61	--	158	--	18	52	34	3	239	236	91	456	365	70	136	66
Fortuna	Wells	6-22-61	--	93	--	--	30	--	--	47	--	---	461	---	---	133	--
Herlong	Wells	8-21-63	98	147	49	346	186	-160	38	87	49	823	840	17	359	229	-130
Mt. Shasta	Springs, Artesian Well	6-12-63	5	19	14	1	5	4	2	12	10	81	146	65	28	32	4
Orland	Wells	7-21-60	18	103	85	14	18	4	22	125	103	298	488	190	172	156	-16
Red Bluff	Antelope Creek, Wells	6-8-60	--	49	--	7	15	8	10	19	9	206	346	140	103	100	-3
Redding	Sacramento River	4-19-61	5	47	42	5	27	22	3	26	23	83	287	204	43	71	28
Scotia	Eel River	2-6-64	--	43	--	25	23	-2	10	23	13	215	238	23	123	64	-59
Susanville	Springs and Wells	4-27-61	--	57	--	114	18	-96	44	25	-19	382	433	51	99	123	24
Weed	Weed Springs	6-12-63	12	26	14	<1	9	8	2	15	13	85	189	104	33	58	25
Willits	Davis Creek	8-16-62	--	51	--	10	22	12	6	32	26	80	263	183	56	102	46
Willows	Wells	7-20-60	--	80	--	25	28	3	17	30	13	352	406	54	208	170	-38
Yreka	Greenhorn Creek, Wells	6-12-63	7	23	16	15	28	13	4	18	14	245	448	203	245	303	58
Median Values			12	51	32	10	21	8	8	32	20	187	376	125	101	101	14

* Changes are positive unless marked negative

TABLE 3

DISPOSAL AND USE OF TREATED WASTE WATERS

Sewage Treatment Facilities-Northern District

Community	Average Discharge			Receiving Waters			Present Reuse	Plans for Reuse	Quality of Treated Water for Irrigation
	Million Gal. Per Day	Acre - Feet Per Year	Measurement	Salt Waters	Streams or Canals [a]	Ground Water [a]			
Alturas	-	-	-		Pit River		None	None	Class 1
Anderson	-	-	-			Percolation Ponds	None	None	Class 1
Arcata	1.04	1,160	7/65-12/66	Arcata Bay			None	Proposed	Class 2-3
California Conservation Center	0.158	180	10/64- 2/67		Leavitt Lake Canal		Irrigation, Stockwater	-	Class 1
Chico	2.1	2,350	1/66-11/66			Percolation Ponds	None	Proposed	Class 1
Colusa	0.44	500	7/61- 6/65		Powell Slough		Irrigation	-	Class 1-2
Corning	-	-	-		Sacramento River		Irrigation	-	Class 1
Crescent City	0.59	660	7/58- 6/64	Pacific Ocean			None	None	Class 1
Dunsmuir	0.36	400	7/60- 6/64			Percolation Ponds	None	None	Class 1
Eureka	2.42	2,700	7/65-12/66	Humboldt Bay			None	Proposed	Class 3
Fortuna	-	-	-		Rohner Creek		None	None	Class 1
Herlong	0.22	2,450	1/66- 3/67			Percolation Ponds	None	None	Class 2
Mt. Shasta	-	-	-		Sacramento River		None	None	Class 1
Orland	-	-	-			Percolation Ponds	None	None	Class 2
Red Bluff	1.24	1,400	1/66-12/66		Sacramento River		None	None	Class 1
Redding	2.50	2,800	7/56- 6/65			Percolation Ponds	None	None	Class 1
Scotia	0.32	360	9/65- 1/67		Eel River		None	None	Class 1
Susanville	0.44	500	7/55- 6/65		Jenson Slough		Irrigation	-	Class 1
Weed	-	-	-		Boles Creek		None	None	Class 1
Willits	0.49	550	1/66-10/66		Broaddus Creek		None	Proposed	Class 1
Willows	0.635	710	2/66-11/66		Glenn Colusa Irrigation District Drain		Irrigation	-	Class 1
Yreka	0.59	660	7/58- 6/65			Dredger Tailings	None	Proposed	Class 1

a/ Undetermined amounts to evaporation and incidental reuse.

CHAPTER III. DETAILED DESCRIPTIONS AND DATA

This chapter is composed of detailed descriptive, graphical, and tabulated information for each of 22 selected sewage treatment facilities in the Northern District. The facilities are reported in alphabetical order. For each facility a similar sequence of material is followed, though not all items are available in all cases.

The first item for each facility is a verbal description. This includes pertinent facts about the community and the facility, flow quantities if available, and a discussion of the quality, present discharge and use practicies, and potential use of the effluent. Certain data are presented graphically. These are, for most facilities: (1) a schematic diagram, (2) a comparison of the effluent and supply water, and (3) curves to indicate the relationship between precipitation and the rate of discharge. There are also, for each facility, several tables of chemical analyses. Two special items are also included which present data from a 24-hour sampling program at the Arcata facility.

CITY OF ALTURAS

Alturas, the county seat of Modoc County, is a city of 2,900 persons. It is situated at the confluence of the North and South Forks of the Pit River. The sewage treatment plant is on the right bank of the North Fork, directly across from the South Fork, in the SW 1/4 of the SW 1/4 of Section 32, T32N, R12E, MDB&M.

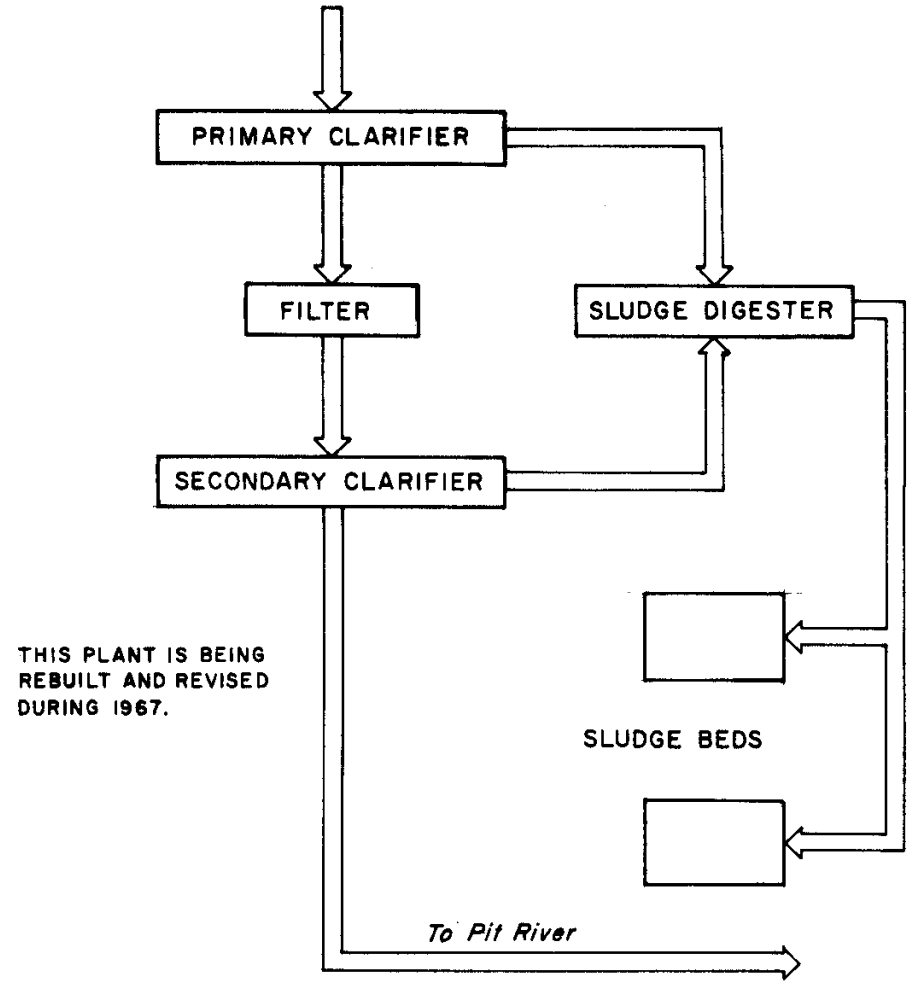
Treatment of the waste water includes primary clarification filtration, and secondary clarification. Based on a single day's measurement the flow through the Alturas sewerage facilities probably averages between 0.23 and 0.25 million gallons per day. Effluent from the treatment plant is discharged to the Pit River. As of April 1967, there was no intentional reuse of the treated water, nor were any plans being developed to make use of the water. The plant is undergoing complete reconstruction during the Spring and Summer of 1967.

Analyses were made of the effluent from the Alturas waste water treatment facilities in June 1960 and June 1963. These analyses indicate that the quality of the effluent is Class 1 for irrigation purposes.

The graph on page 19 shows a comparison of analyses of the water supply for 1962 and of an effluent sample for June 1963. This information indicates that the increases in the concentrations of the major constituents are greater than for most sewerage facilities in the Northern District.

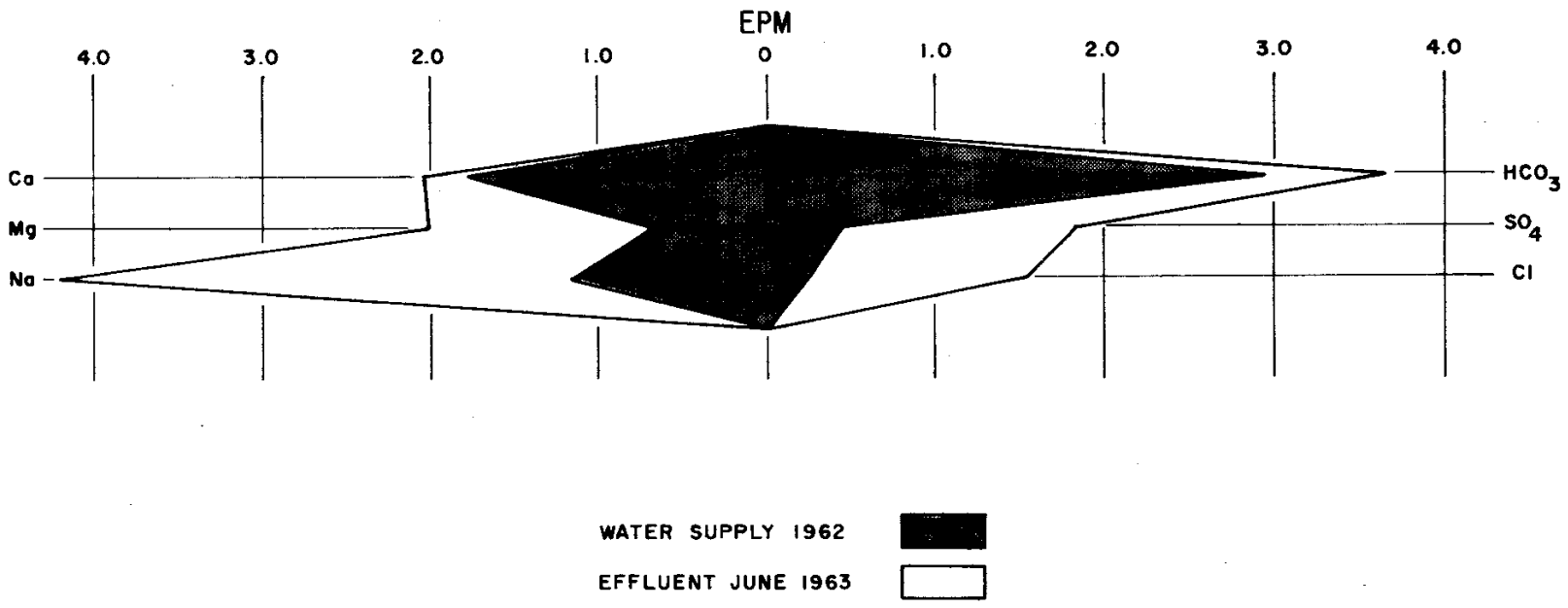
Although the increments of major constituents are greater than most, the mineral quality of the water is still within the recommended limits of the drinking water standards. In the event a market exists or can be created for reclaimed water in the vicinity of Alturas, it is

reasonable to assume the effluent from the plant would be acceptable for most beneficial uses with little or no additional treatment.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF ALTURAS



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT
CITY OF ALTURAS

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
City of Alturas																						
Final effluent	6-25-60 / --	Comp.	--	- / 7.4	728	20 / 1.00	21 / 1.76	68 / 2.96	20 / 0.51	20 / 1.11	0 / 0.00	303 / 4.97	50 / 1.04	40 / 1.13	0.5 / 0.01	0.5	--	71	463[a]	138	0	40
Final effluent	6-5-63 / 0800	Grab	--	- / 7.5	944	41 / 2.04	24 / 2.02	96 / 4.18	14 / 0.36	--	0 / 0.00	223 / 3.65	87 / 1.81	52 / 1.47	100 / 1.61	0.3	0.4 / 0.02	66	596[a]	203	20	46

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Alturas																						
Final effluent	6-5-63 0800	Grab	--	--	--	--	--	--	--	--	--	4.5	--	--	--	5.8	--	--	--	--	29	--

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Alturas																				
Final effluent	6-5-63 / 0800	Grab	--	<1.4	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	37	<5.7	<0.29	107	<0.29	3.1	<1.4	<0.57	74	<5.7

CITY OF ANDERSON

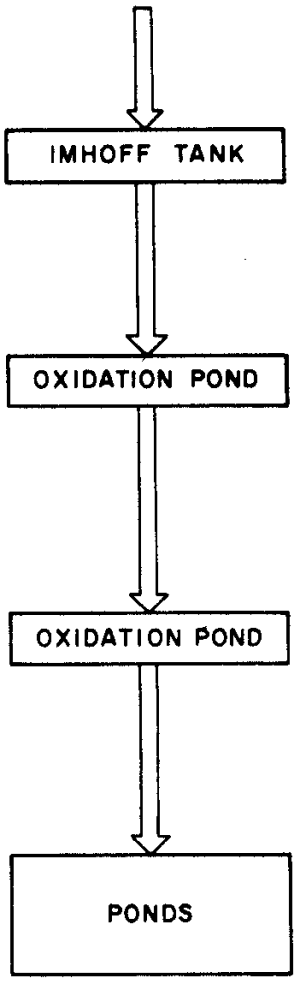
Anderson is a city of 6,050 persons in southern Shasta County. It is on Interstate Highway 5, 12 miles south of Redding and 1.5 miles west of the Sacramento River. The sewage treatment plant is about 1.5 miles northeast of town, adjacent to the Sacramento River at the terminus of Rupert Road, in the SW 1/4 of the SW 1/4 of Section 11, T30N, R4W, MDB&M.

Treatment of the waste water includes an Imhoff tank and oxidation-percolation ponds. No data are available on the quantity of waste being treated by the Anderson sewerage facility. Effluent from the treatment plant is disposed of by evaporation and infiltration to ground water from the ponds. As of April 1967, all effluent is discharged to ground water by percolation from the ponds. There is no evidence that any plans for use of the effluent are being made.

Analyses were made of the effluent from the Anderson waste water treatment facilities in January 1964 and April 1965. The quality of the effluent appears to be Class 1 for irrigation purposes.

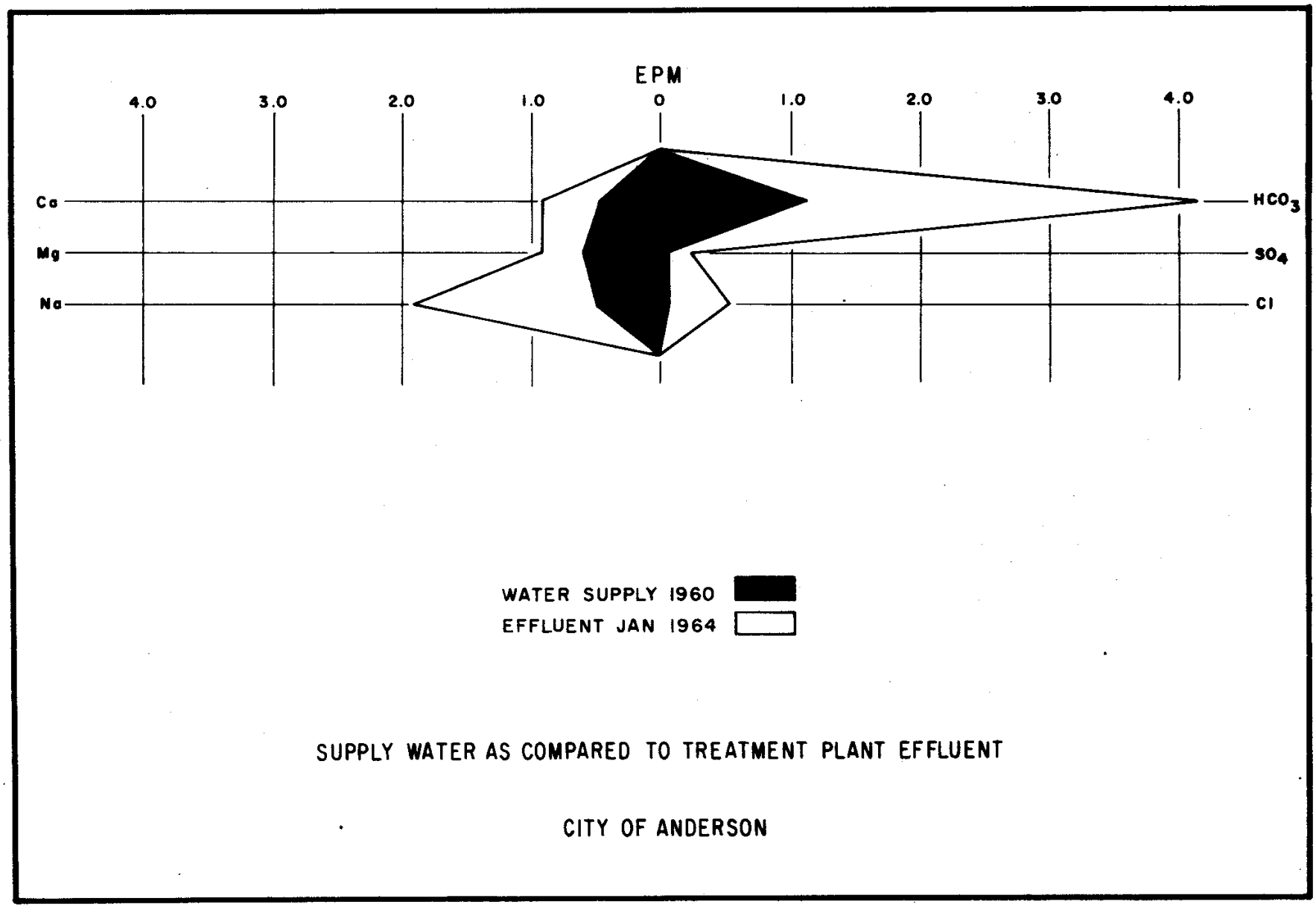
The graph on page 25 shows a comparison of analyses of the supply water for 1960 and of the effluent for January 1964. These analyses indicate that the increments for the major chemical constituents are generally close to the median increment values for the sewerage facilities located within the Northern District.

The mineral quality of the treated waste water from the Anderson plant is within the recommended limits of the drinking water standards. In the event water users in the area of the Anderson treatment plant should decide to directly utilize the effluent, it is reasonable to assume this could be accomplished with little or no additional treatment.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF ANDERSON



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF ANDERSON

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
City of Anderson																						
Initial percolation pond	1-30-64 / 1430	Grab	0.82	7.3 / 7.1	602	18 / 0.90	11 / 0.90	43 / 1.87	11 / 0.28	36 / 2.00	0 / 0.00	254 / 4.16	13 / 0.27	20 / 0.56	1.0 / 0.02	0.3	0.2 / 0.01	39	274	90	0	31
Initial percolation pond	4-7-65 / 1600	Grab	--	- / 7.5	548	33 / 1.65	5.0 / 0.41	36 / 1.57	9.6 / 0.24	--	0 / 0.00	239 / 3.92	20 / 0.42	23 / 0.65	--	0.5	--	--	251	103	0	40

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Anderson																						
Initial percolation pond	1-30-64 / 1430	Grab	0.82	--	--	--	--	--	--	--	--	6.1	--	--	--	--	--	--	--	--	31	--
Initial percolation pond	4-7-65 / 1600	Grab	--	--	--	--	--	--	--	--	--	6.4	--	--	--	--	--	0.1	--	21	--	--

ANALYSES OF WASTE WATER
PART 3

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Anderson										
Initial percolation pond	1-30-64 / 1430	Grab	0.82	--	--	--	--	--	5.2±4.7	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Anderson																				
Initial percolation pond	1-30-64 / 1430	Grab	0.82	2.6	<0.57	<0.29	<1.4	<1.4	<1.4	11	39	<5.7	<0.29	7.0	1.3	2.8	<1.4	<0.57	1.1	<5.7

CITY OF ARCATA

Arcata is a city of 5,800 persons in Humboldt County about seven miles northeast of Eureka, just north of Arcata Bay. The sewage treatment plant is about 0.5 mile south of Fourth Street, at the foot of G Street on the north shore of Arcata Bay, in the SE 1/4 of the SE 1/4 of Section 32, T6N, R1E, HB&M. The area served includes approximately 7,400 persons.

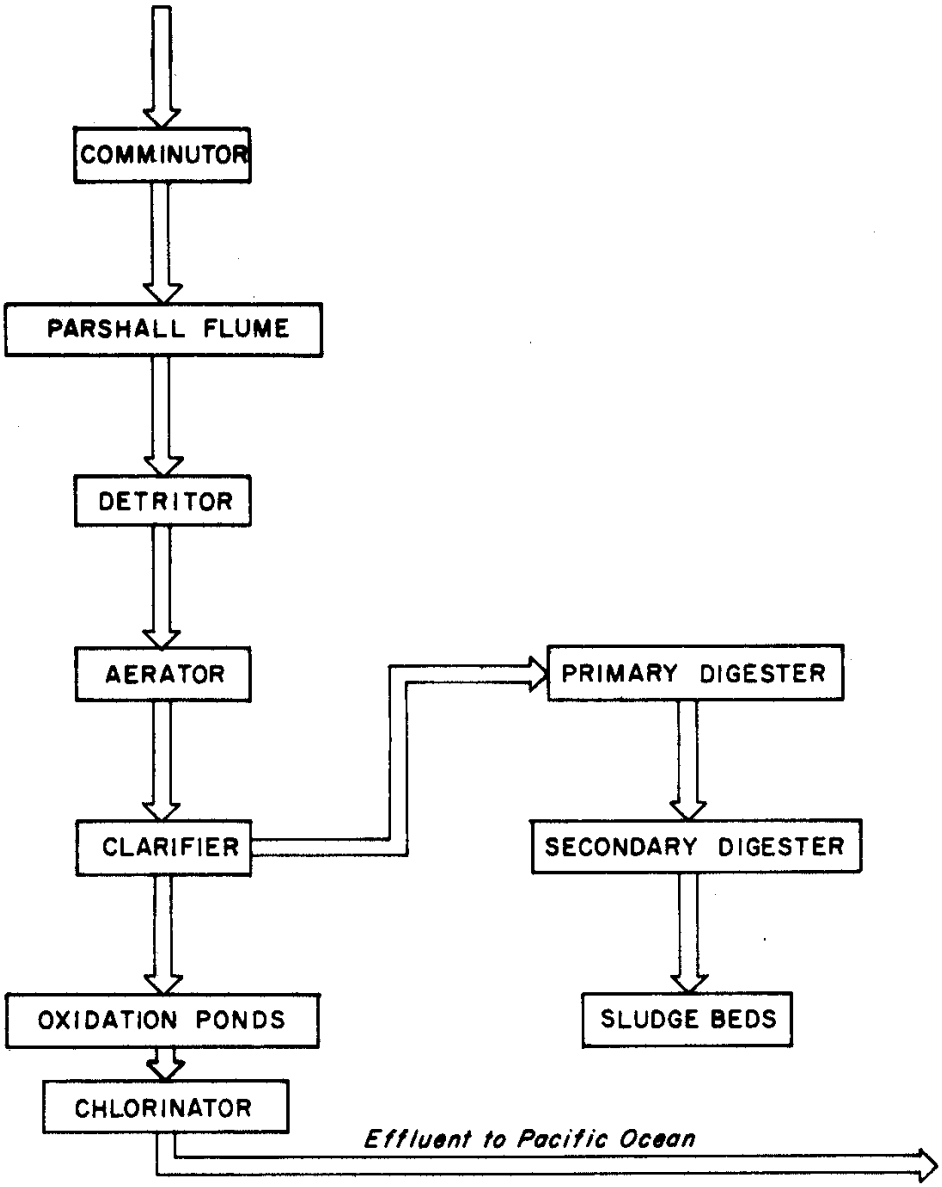
Treatment of the waste water includes comminution, detrition, aeration, clarification, and oxidation by ponding. For the period July 1958 through June 1965, discharges from the waste water treatment plant averaged 1.11 million gallons per day, or 1,250 acre-feet per year. For July 1965 through December 1966, they averaged 1.04 million gallons per day or 1,160 acre-feet per year. Effluent from the plant is discharged to the salt waters of Arcata Bay. As of May 1965, no intentional use was made of the treated waste water. The use of reclaimed water from the Arcata plant for irrigation of a golf course has been considered by the Baywood Golf and Country Club.

Analyses were made of the effluent from the Arcata waste water treatment plant collected in the spring and summer months from 1959 through 1965. These analyses indicate that the quality of the effluent is rather variable and that it ranges from Class 2 to Class 3 for irrigation purposes.

The graph on page 33 shows a comparison of analyses of the supply water for the year 1961 and of the effluent for June 1961 when it was Class 2 These analyses indicate that even then the increase in concentrations of the major chemical constituents were all relatively large. The increment value for chloride and sodium are most notably excessive, which would tend to indicate the influence of saline waters.

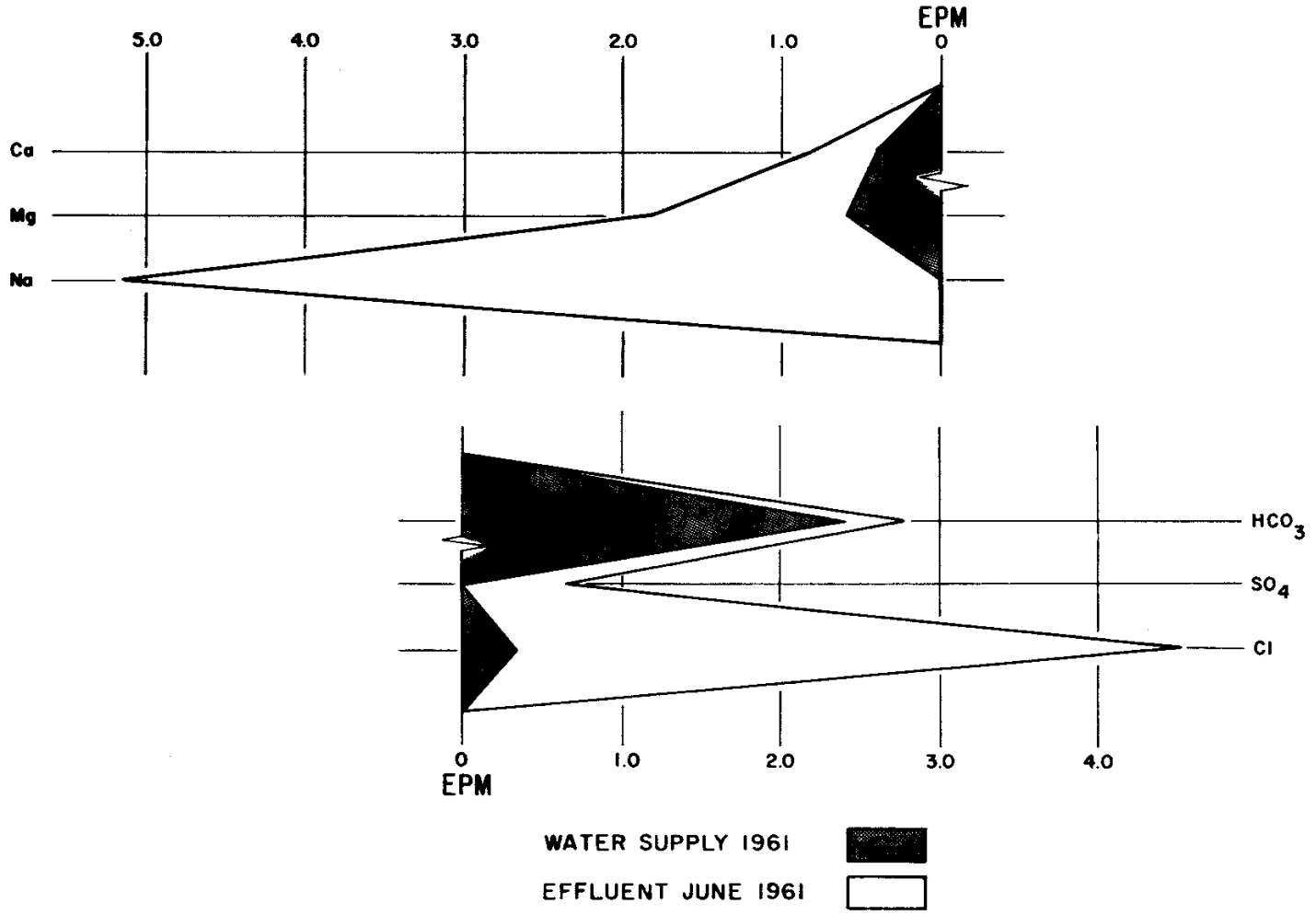
Due to the interest in reclamation of wastes from this plant and the extreme variability of mineral content of the wastes, a twenty-four hour sampling program was undertaken to determine the extent of the variation and how it correlates with the tides. During the sampling period, hourly determinations were made of flow rate, temperature, pH, chloride concentration, and specific conductance. These data are presented on Pages 39-40, as are graphs showing the correlation of the other variables with tidal stage. These data indicated that before usable water can be reclaimed from the system, consideration must be given to means of excluding the salt water from the system or locating sites along the system above which no significant inflows of salt water occur.

The supply water to the City of Arcata is within the recommended limits of the drinking water standards. The effluent, however, often exceeds the recommended limits in concentrations of total dissolved solids and chloride.

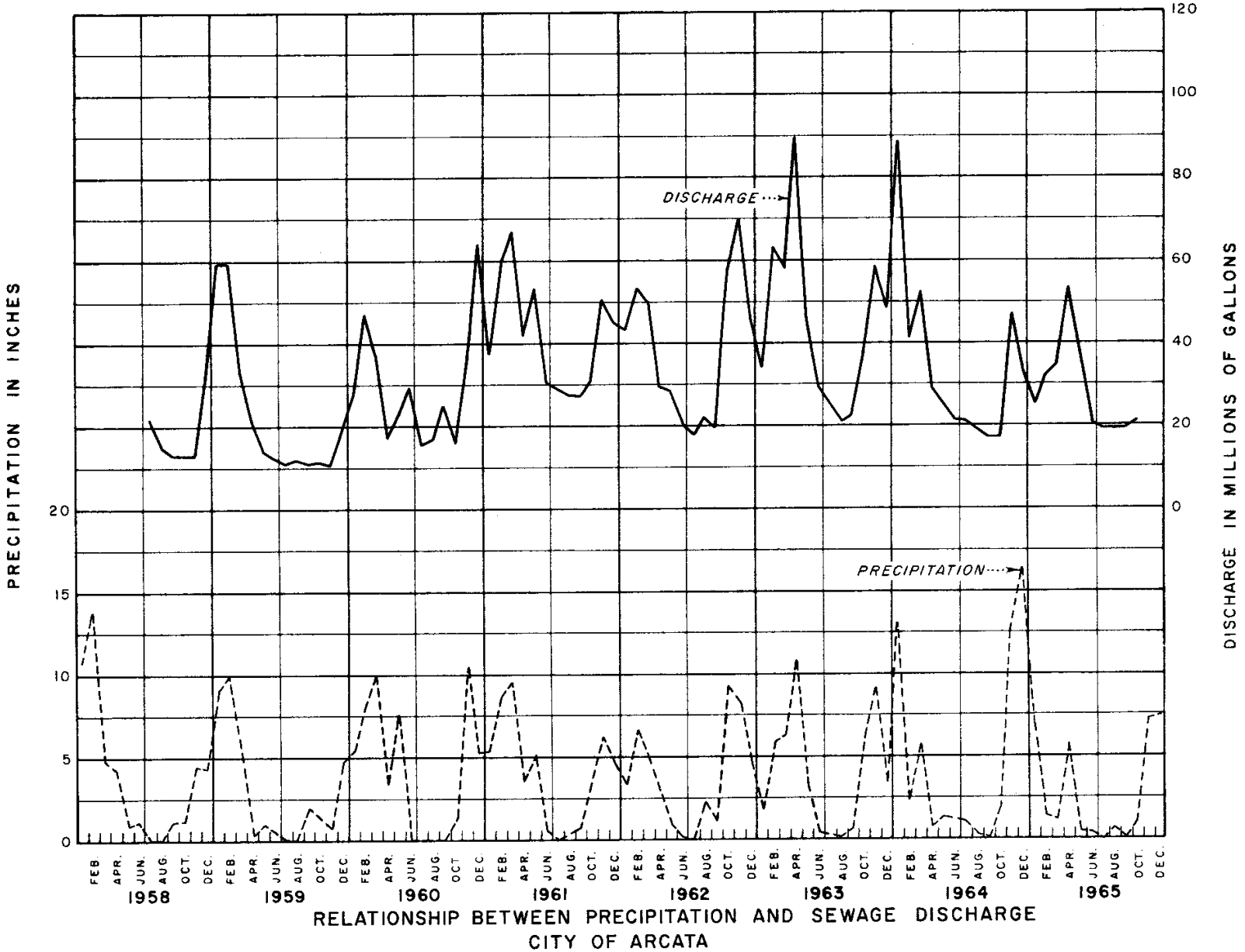


SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF ARCATA



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT
CITY OF ARCATA



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF ARCATA

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents, milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
City of Arcata																						
Effluent from clarifier	5-13-59 -- 8 hr.	Comp.	0.9	- / 7.5	968	31 / 1.55	13 / 1.11	104 / 4.52	1.2 / 0.03	41 / 2.27	0 / 0.00	372 / 6.10	39 / 0.81	87 / 2.45	1.3 / 0.02	0.37	1.3 / 0.07	36	541 [a]	133	0	48
Influent to pond	6-14-61 -- 24 hr	Comp.	--	7.5 / 7.5	916	20 / 1.00	21 / 1.70	117 / 5.09	10 / 0.26	6.4 / 0.35	0 / 0.00	184 / 3.02	31 / 0.64	164 / 4.62	0.02 / 0.00	0.02	0.02 / 0.01	24	496 [a]	135	0	60
Effluent from pond	6-14-61 -- 24 hr	Comp.	--	7.7 / 7.1	895	16 / 0.80	22 / 1.80	118 / 5.13	10 / 0.26	5.4 / 0.30	0 / 0.00	170 / 2.79	31 / 0.64	162 / 4.57	1.0 / 0.02	0.03	0.3 / 0.02	20	477 [a]	130	0	60
Effluent from pond	8-15-62 1000	Grab	--	8.5 / 8.1	3100	35 / 1.75	60 / 4.94	410 / 17.84	22 / 0.56	5.7 / 0.32	0 / 0.00	198 / 3.24	110 / 2.29	795 / 22.42	15 / 0.24	0.8	0.4 / 0.02	28	1581 [a]	335	173	79
Effluent from pond	8-28-63 0900	Grab	--	8.5 / 7.2	2060	40 / 2.00	36 / 2.92	295 / 12.83	21 / 0.54	27 / 1.50	0 / 0.00	48 / 0.79	67 / 1.39	483 / 13.62	158 / 2.55	0.8	0.3 / 0.02	38	1200	946	707	69
Effluent from pond	5-26-65 1600	Grab	1.1	8.6 / 9.2	1480	20 / 1.00	28 / 2.32	220 / 9.57	16 / 0.41	--	25 / 0.83	71 / 1.16	61 / 1.27	334 / 9.42	--	0.4	--	--	896	166	67	72
Effluent from clarifier	5-27-65 0945	Grab	1.2	6.9 / 7.8	2120	33 / 1.65	36 / 2.99	273 / 11.88	26 / 0.66	--	0 / 0.00	355 / 5.82	77 / 1.60	426 / 12.02	--	0.3	--	--	1060	232	0	69
Influent, after comminutor	8-4-65 1300	Grab	0.95	8.0 / 7.4	1490	25 / 1.25	28 / 2.35	198 / 8.61	17 / 0.43	--	0 / 0.00	304 / 4.98	62 / 1.29	244 / 6.88	0.6 / 0.01	0.6	--	--	787	180	0	68
Influent, after comminutor	8-5-65 0600	Grab	0.20	8.2 / 7.7	4710	56 / 2.79	93 / 7.62	738 / 32.10	45 / 1.15	--	0 / 0.00	272 / 4.46	18 / 0.37	1240 / 34.95	0.2 / 0.00	0.2	--	--	2780	591	293	74

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Arcata																						
Effluent from clarifier	5-13-59 --	Comp.	0.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33	--
Influent to pond	6-14-61 --	Comp.	--	--	--	--	--	--	--	--	--	3.1	--	--	33	--	--	--	--	--	--	--
Effluent from pond	6-14-61 --	Comp.	--	--	--	--	--	--	--	--	--	4.4	--	--	20	--	--	--	--	--	--	--
Effluent from pond	8-15-62 1000	Grab	--	--	--	--	--	--	--	--	--	3.4	--	--	--	--	--	--	--	--	--	1
Effluent from clarifier	8-28-63 0900	Grab	--	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	--	--	--	17	--
Effluent from pond	5-26-65 1600	Grab	1.1	--	--	--	--	--	--	--	--	1.5	--	--	--	--	--	0.3	--	8.7	--	16
Effluent from clarifier	5-27-65 0945	Grab	1.2	--	--	--	--	--	--	--	--	0.8	--	--	--	--	--	0.4	--	30	--	23

NORTH COASTAL REGION NO. 1

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Arcata										
Effluent from clarifier	2-13-59 --	Comp.	0.9	152	--	32.6	0.15±0.26	8.7±4.2	--	
Influent to pond	6-14-61 --	Comp.	--	18	--	7.5	--	--	7.4±3.1	
Effluent from pond	6-14-61 --	Comp.	--	14	--	7.1	--	--	13.2±3.2	
Effluent from pond	8-15-62 1000	Grab	--	--	--	--	--	--	16.2±3.6	
Effluent from clarifier	8-28-63 0900	Grab	--	--	--	--	--	--	17.2±5.0	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

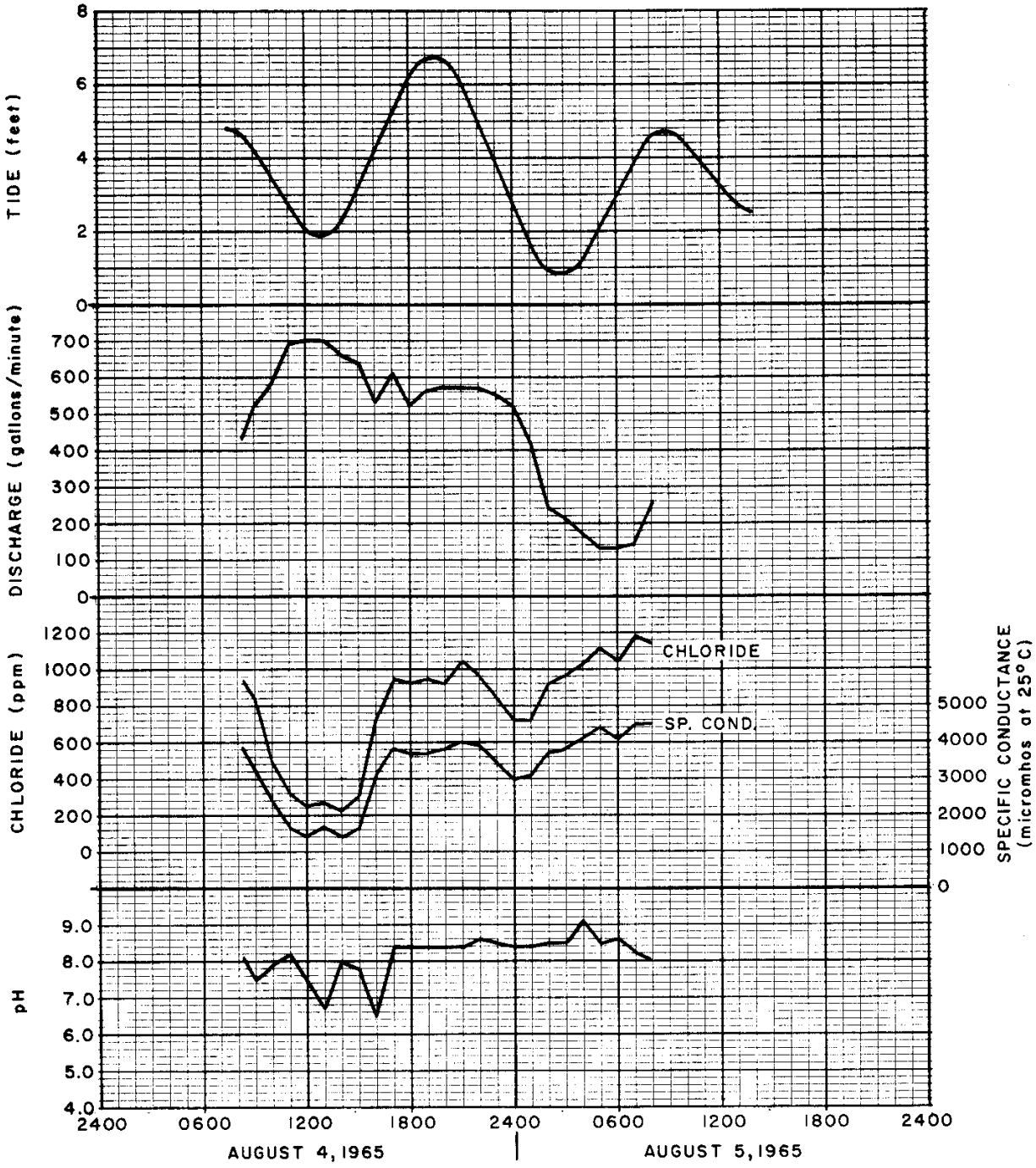
PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Arcata																				
Effluent from pond	8-15-62 / 1000	Grab	--	15	<1.3	<0.67	<3.3	<3.3	<3.3	<3.3	11	<13	<0.67	<3.3	<0.67	3.9	<3.3	<1.3	<0.67	<13
Effluent from clarifier	8-28-63 / 0900	Grab	--	12	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	>25	<5.7	<0.29	6.6	<0.29	6.0	3.7	9.4	2.9	<5.7

TABLE
TWENTY-FOUR HOUR SAMPLING RECORD OF
INFLOW TO ARCATA SEWAGE TREATMENT PLANT
August 4-5, 1965

Time (P. D. T.)	Flow (gallons per minute)	Temperature (°F)	pH	Chloride (ppm)	Specific Conductance (micromhos at 25°C)
0820	430		8.1	930	3850
0900	520	70	7.5	840	3270
1000	580	71	7.9	490	2380
1100	690	72	8.2	325	1660
1200	700	72.5	7.5	250	1430
1300	700	73	6.7	265	1670
1400	660	73	8.0	235	1420
1500	640	74.5	7.8	306	1660
1600	530	73.5	6.5	714	3130
1700	610	73	8.4	938	3850
1800	520	73	8.4	918	3715
1900	560	72	8.4	938	3760
2000	570	72	8.4	918	3850
2100	570	72	8.4	1040	4010
2200	570	72	8.6	960	3930
2300	550	71	8.5	840	3420
2400	520	71	8.4	714	3000
0100	420	71	8.4	714	3120
0200	240	69.5	8.5	918	3770
0300	210	69	8.5	960	3850
0400	170	69.5	9.1	1020	4160
0500	130	69	8.5	1120	4405
0600	130	68.5	8.6	1040	4070
0700	140	68.5	8.2	1183	4540
0800	250	69.5	8.0	1140	4535



RELATIONSHIP BETWEEN TIDE, DISCHARGE AND MINERAL CHARACTERISTICS - ARCATA SEWAGE TREATMENT PLANT INFLUENT

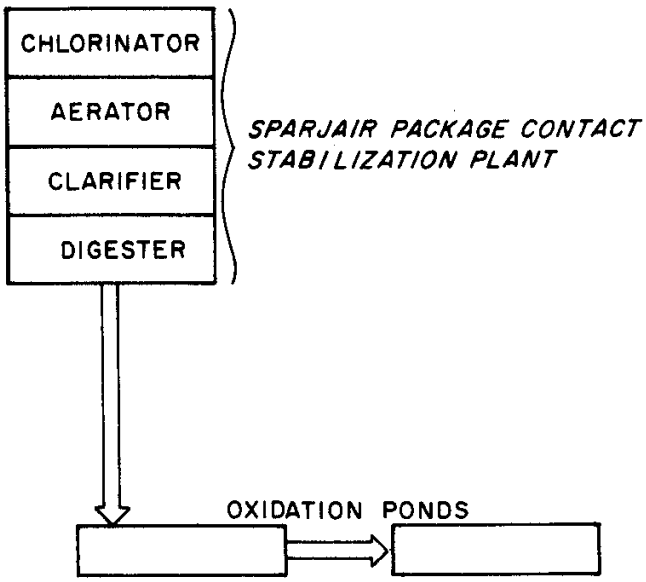
CALIFORNIA CONSERVATION CENTER

The California Conservation Center, 8 miles east of Susanville in Lassen County, is an institution for rehabilitating men. It is operated jointly by the State Departments of Conservation and Corrections. The sewage treatment plant for the Center is located about one mile east of Leavitt siding, and north of Leavitt-Litchfield Road in the NE 1/4 of the SW 1/4 of Section 3, T29N, R13E, MDB&M. The system serves a population of 1,200 persons.

Treatment of the waste water includes screening, comminution, a Sparjair Total Package Contact Stabilization Plant, and oxidation by ponding. For the period October 1964 through October 1965 and February 1966 through February 1967 the average daily flow was 0.16 million gallons per day. Water from the treatment plant is reclaimed and used for irrigation of pastures and for livestock watering.

Analyses were made of the effluent from the California Conservation Center waste water treatment plant in June 1963, April 1964, and February 1965. These analyses indicate that the quality of the reclaimable water is Class 1 for irrigation purposes. The mineral quality of the treated waste water is within the recommended limits of the drinking water standards.

An agreement has been drawn between the State of California and ranchers downstream from the Center granting a permanent right for the State to discharge its treated waste water to the ranchers' canal. It is reasonable to expect that all available effluent from the plant will be put to beneficial use during irrigation periods.



SCEMATIC OF WASTE WATER

TREATMENT FACILITIES

CALIFORNIA CONSERVATION CENTER

ANALYSES OF WASTE WATER
PART I

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents, milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
California Conservation Center																						
SW corner of Lagoon #1	6-5-63 / 1400	Grab	--	- / 7.8	577	6.6 / 0.33	1.1 / 0.09	108 / 4.70	16 / 0.41	2.5 / 0.18	0 / 0.00	247 / 4.05	26 / 0.54	31 / 0.87	1.3 / 0.02	0.8	1.4 / 0.07	69	387[a]	21	0	89
Effluent from ponds	4-9-64 / 1055	Grab	--	8.0 / 7.5	592	11 / 0.55	0.8 / 0.07	94 / 4.09	23 / 0.59	12 / 0.66	0 / 0.00	247 / 4.05	22 / 0.46	33 / 0.93	1.0 / 0.02	0.8	--	--	422	31	0	89
Effluent from ponds	2-4-65 / 1500	Grab	0.22	- / 8.9	480	--	--	--	--	--	16 / 0.53	149 / 2.44	--	26 / 0.73	0.6 / 0.01	--	--	--	337	74	--	--

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
California Conservation Center																						
SW corner of Lagoon #1	6-5-63 / 1400	Grab	--	--	--	--	--	--	--	--	--	2.3	--	--	--	2.5	--	--	--	--	22	--
Effluent from discharge box	4-9-64 / 1055	Grab	--	--	--	--	--	--	--	--	--	0.8	--	--	--	--	--	--	--	--	24	--
Effluent from ponds	2-4-65 / 1500	Grab	0.22	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	--	--	--	--	10

LAHONTAN REGION NO. 6

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (ml/L)	Other solids (ppm)	Radioactivity: Alpha	Beta	Gross	Remarks
California Conservation Center SW corner of Lagoon #1	6-5-63 / 1400	Grab	--	--	--	--	--	--	3.5±4.[illegible]	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
California Conservation Center																				
Effluent from discharge box	4-9-64 / 1055	Grab	--	>13.00	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	>200	<5.7	<0.29	<1.4	<0.29	5.4	<1.4	110	7.7	<5.7
Effluent from ponds	2-4-65 / 1500	Grab	0.22	76	<0.54	<0.27	<1.4	<1.4	<1.4	<1.4	200	<5.4	<0.27	38	3.8	4.3	<1.4	<0.54	1.7	<5.4

CITY OF CHICO

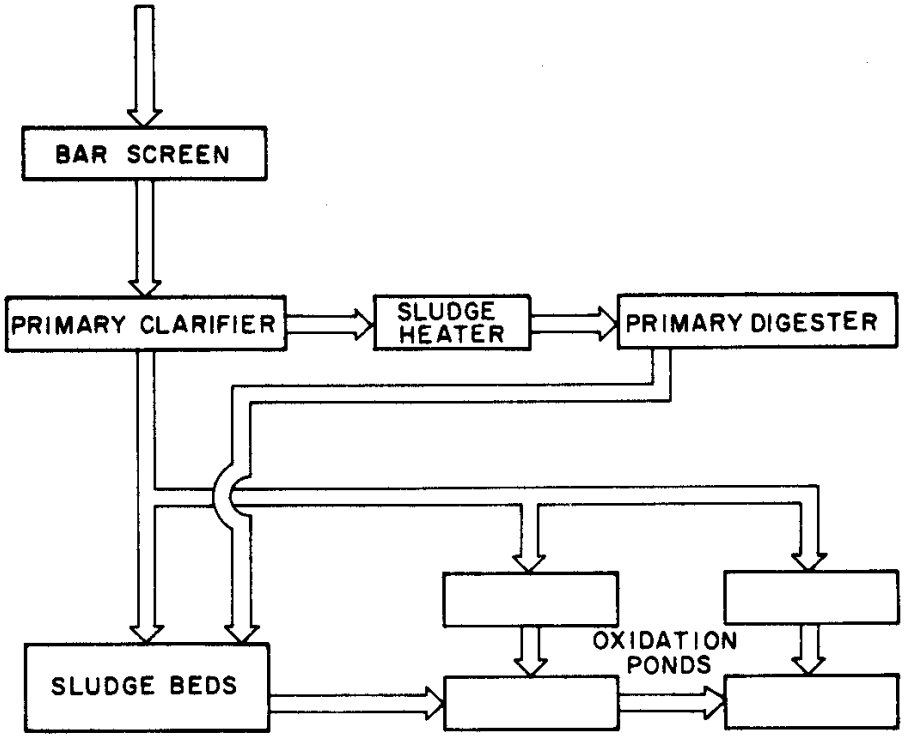
Chico is a city of 18,100 persons in western Butte County. It is on Highway 99 and about 5 miles east of the Sacramento River. The sewage treatment plant is about 5 miles southwest of Chico on River Road, 1 mile east of Fell Road, in the SE 1/4 of the SW 1/4 of Section 6, T21N, R1E, MDB&M.

Treatment of the waste water includes screening, detrition, clarification and oxidation by ponding. For the period July 1956 through June 1965, discharges from the waste water treatment facilities averaged 1.45 million gallons per day, or 1,640 acre-feet per year. During the period January through November 1966, the flow averaged 2.1 million gallons per day or 2,350 acre-feet per year. Prior to April 1967, overtures had been made for permission to use the treated effluent for irrigation of rice.

Analyses were made of the effluent from the Chico waste water treatment plant periodically from June 1956 through November 1965. Based on these analyses, the quality of the effluent is acceptable as Class 1 for irrigation purposes.

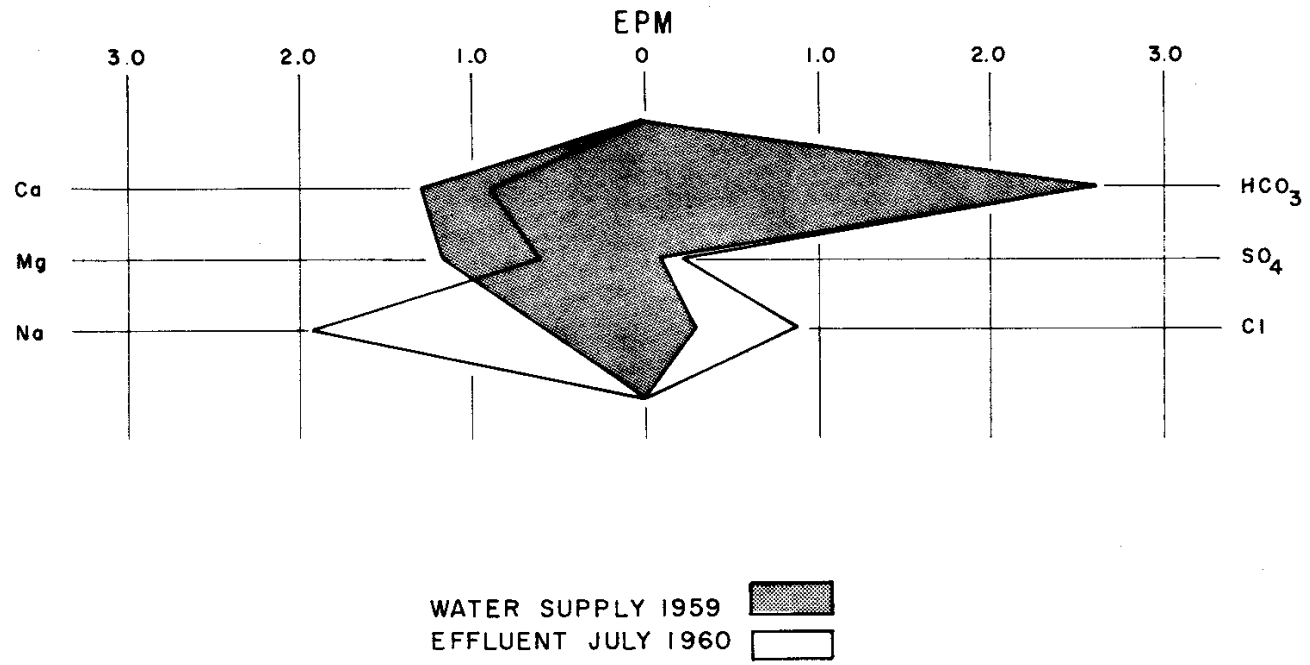
The graph on page 49 shows a comparison of analyses of the supply water for the year 1959 and of the effluent for July 1960. These analyses indicate that the increases in concentration of the major chemical constituents in the waste water is about normal for domestic purposes.

The supply water to the City of Chico and the effluent from the treatment plant are within the recommended limits of the drinking water standards. There is no reason to suspect that all the effluent could not be put directly to beneficial use.



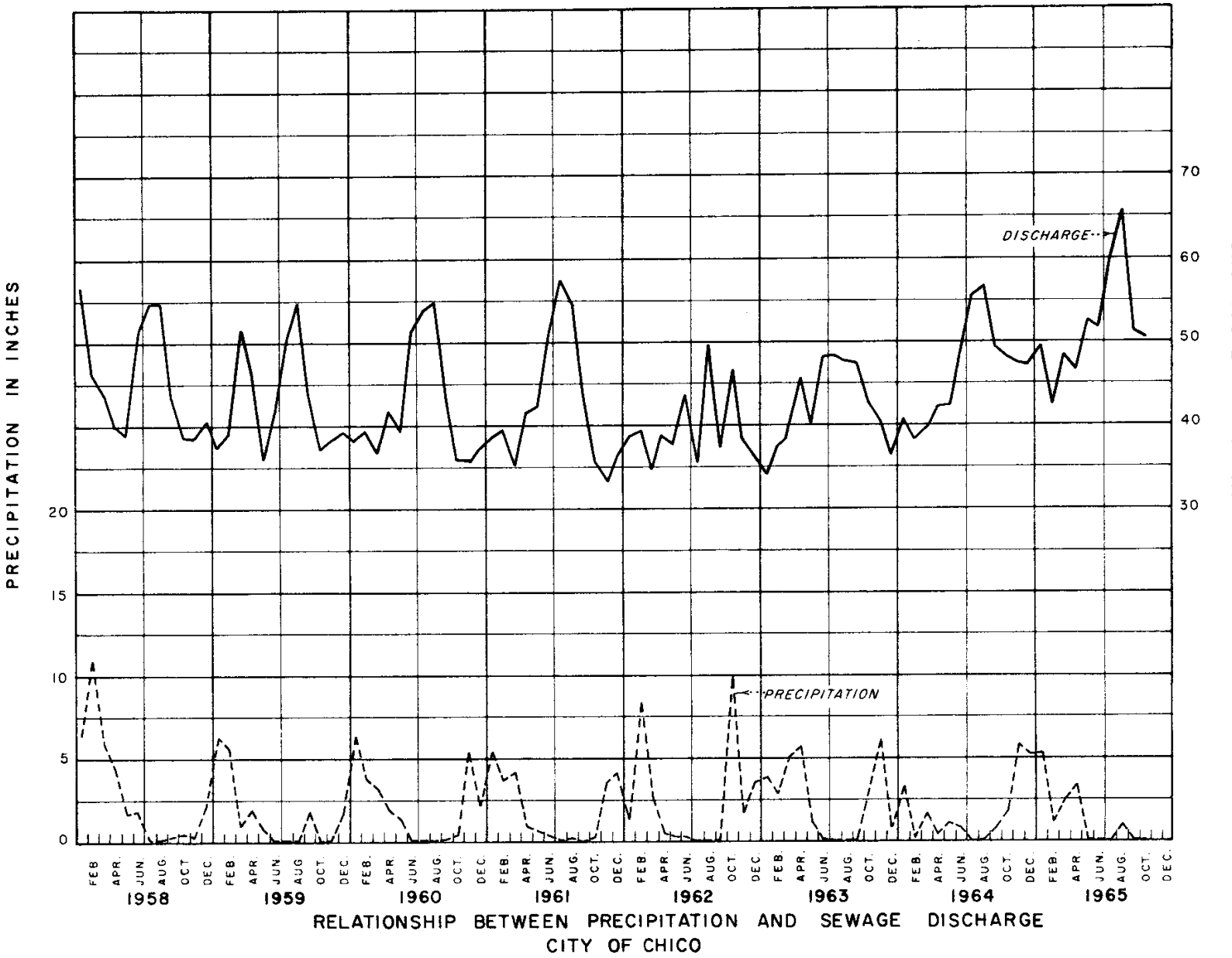
SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF CHICO



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF CHICO



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF CHICO

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents, milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
City of Chico																						
Effluent from clarifier	6-19-56 -- 24 hr.	Comp.	3.57	- / 7.3	568	17 / 0.85	18 / 1.48	49 / 2.13	7.2 / 0.18	24 / 1.32	0 / 0.00	277 / 4.54	13 / 0.27	32 / 0.90	0.4 / 0.01	0.30	--	28	357[a]	116	0	46
Effluent from clarifier	7-9-57 --	Comp.	1.69	- / 7.1	487	19 / 0.95	16 / 1.33	44 / 1.91	5.7 / 0.15	16 / 0.89	0 / 0.00	227 / 3.72	1.9 / 0.04	36 / 1.02	0.3 / 0.00	0.20	1.2 / 0.06	28	313[a]	114	0	37
Ponds	7-21-60 --	Comp.	1.73	- / 7.3	356	18 / 0.90	7.3 / 0.60	44 / 1.91	7.0 / 0.18	1.7 / 0.09	0 / 0.00	142 / 2.33	10 / 0.21	32 / 0.90	0.7 / 0.01	0.2	--	49	241[a]	75	0	59
Ponds	4-20-61 --	Grab	1.31	- / 7.4	460	21 / 1.05	13 / 1.05	27 / 1.17	6.5 / 0.17	14 / 0.78	0 / 0.00	208 / 3.41	11 / 0.23	21 / 0.59	0.9 / 0.01	0.2	0.2 / 0.01	47	266	105	0	45
Ponds	8-14-62 1000	Grab	1.59	9.2 / 8.2	468	26 / 1.30	10 / 0.86	23 / 2.30	8.2 / 0.21	4.1 / 0.23	0 / 0.00	198 / 3.24	12 / 0.25	46 / 1.10	0.2 / 0.00	0.4	0.4 / 0.02	59	314[a]	102	0	49
Ponds	1-23-64 1100	Grab	1.32	8.4 / 8.0	543	14 / 0.70	16 / 1.32	57 / 2.48	9.0 / 0.23	16 / 0.89	0 / 0.00	230 / 3.77	16 / 0.33	32 / 0.90	0.6 / 0.01	0.4	0.4 / 0.02	51	339	101	0	44
SE Pond	1-13-65 1005	Grab	1.93	7.8 / 7.6	550	26 / 1.30	8.5 / 0.70	42 / 1.83	5.0 / 0.20	16 / 0.89	0 / 0.00	229 / 3.75	17 / 0.35	32 / 0.90	3.1 / 0.05	0.3	--	--	290	100	0	43
Pond adjacent to canal	11-17-65 1440	Grab	--	7.2 / 8.1	570	16 / 0.80	16 / 1.30	47 / 2.04	9.6 / 0.24	--	0 / 0.00	241 / 3.95	21 / 0.44	34 / 1.00	1.5 / 0.02	0.2	--	--	333	105	0	46

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Chico																						
Effluent from clarifier	7-9-57 --	Comp.	1.7	--	--	--	--	--	--	--	--	--	15	--	82	--	--	--	--	--	--	--
Ponds	7-21-60 --	Comp.	1.7	--	--	--	--	--	--	--	--	--	--	--	55	--	--	--	--	--	8.5	--
Ponds	4-20-61 --	--	1.3	--	--	--	--	--	--	--	--	--	--	--	38	--	--	--	--	--	14	--
SW pond	8-14-62 1000	Grab	--	--	--	--	--	--	--	--	--	2.1	--	--	--	4.1	--	--	--	--	18	--
SE pond	1-23-64 1100	Grab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.51	--
SW pond	1-13-65 1005	Grab	1.5	--	--	--	--	--	--	--	--	3.7	--	--	--	16	--	--	--	--	21	22
Pond adjacent to canal	11-17-65 1440	Grab	--	--	--	--	--	--	--	--	--	2.2	--	--	--	--	--	--	--	17	26	26

CENTRAL VALLEY REGION NO. 5

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Chico										
Effluent from clarifier	6-19-56 --	Comp.	3.6	70	--	--	--	--	--	
Effluent from clarifier	7-9-57 --	Comp.	1.7	88	--	--	--	--	--	
Effluent	8-3-58 --	--	--	--	--	--	0.0±0.36	3.2±3.4	--	
Ponds	7-21-60 --	Comp.	1.7	142	--	1.6	--	--	--	
Ponds	4-20-61 --	--	1.3	--	--	10	--	--	--	
SW pond	8-14-62 1000	Grab	--	--	--	--	--	--	1.0±3.4	
SE pond	1-23-64 1100	Grab	--	--	--	--	--	--	23.1±4.9	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Chico																				
SW pond	8-14-62 / 1000	Grab	--	5.5	<1.3	<0.67	<3.3	<3.3	<3.3	<3.3	23	<13	<0.67	<3.3	≤0.67	7.3	<3.3	<1.3	8.0	<13
SE pond	1-23-64 / 1100	Grab	--	12	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	149	<5.7	<0.29	34	<0.29	11	<1.4	<0.57	10	<5.7

CITY OF COLUSA

Colusa, county seat of Colusa County, is a city of 3,800 persons. The town is on State Highway 20 on the west bank of the Sacramento River. The sewage treatment plant is about 1.5 miles southwest of town, west of the Colusa Airport, in the NE 1/4 of the SE 1/4 of Section 36, T16N, R2W, MDB&M.

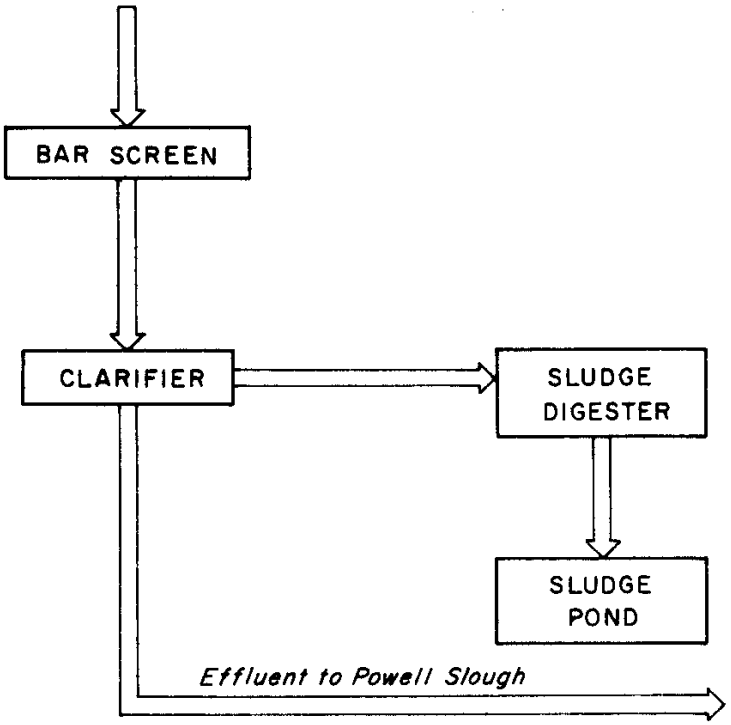
Treatment of the waste water includes screening and clarification. For the period July 1961 through June 1965 discharges from the waste water treatment plant averaged 0.44 million gallons per day, or 500 acre-feet per year. Effluent from the plant is discharged about 1 mile to the southwest into Powell Slough. As of January 1965, water from the slough that included treated waste water had been used for irrigation of rice fields. There is no means of determining the volumes of reclaimed water that are beneficially used.

Analyses were made of the effluent from the Colusa treatment plant periodically from July 1960 through January 1965. Based on these analyses, the quality of the effluent ranges between Class 1 and Class 2 for irrigation purposes because the concentrations of boron and sodium percentage were sometimes high.

The graph on page 58 shows a comparison of analyses of supply water to the City of Colusa for the year 1961 and of the effluent for February 1964. These analyses indicate that the increments for the major chemical constituents, with the exception of bicarbonate, are less than the median values for the sewage facilities considered in the study. The bicarbonate increments are about 2.5 times the norm.

It is reported that one farmer in the area may switch to more tolerant crops due to what he considers excessive concentrations of salts. This

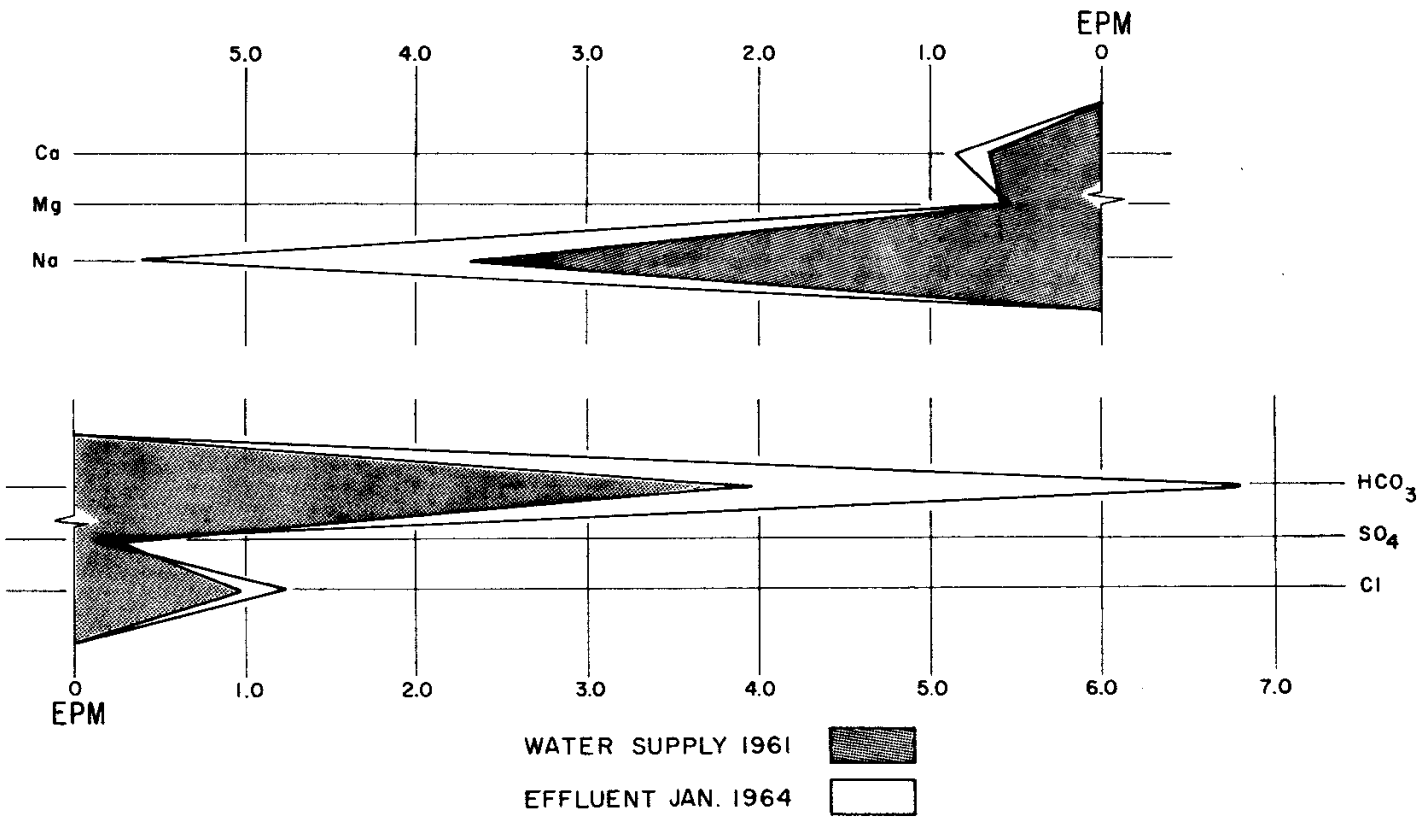
conclusion may be aggravated by the fact the slough is also a recipient of much return irrigation water. It would seem that, with better management of the slough and selective extraction of slough waters, a greater acreage could be irrigated with reclaimed water than presently is being done.



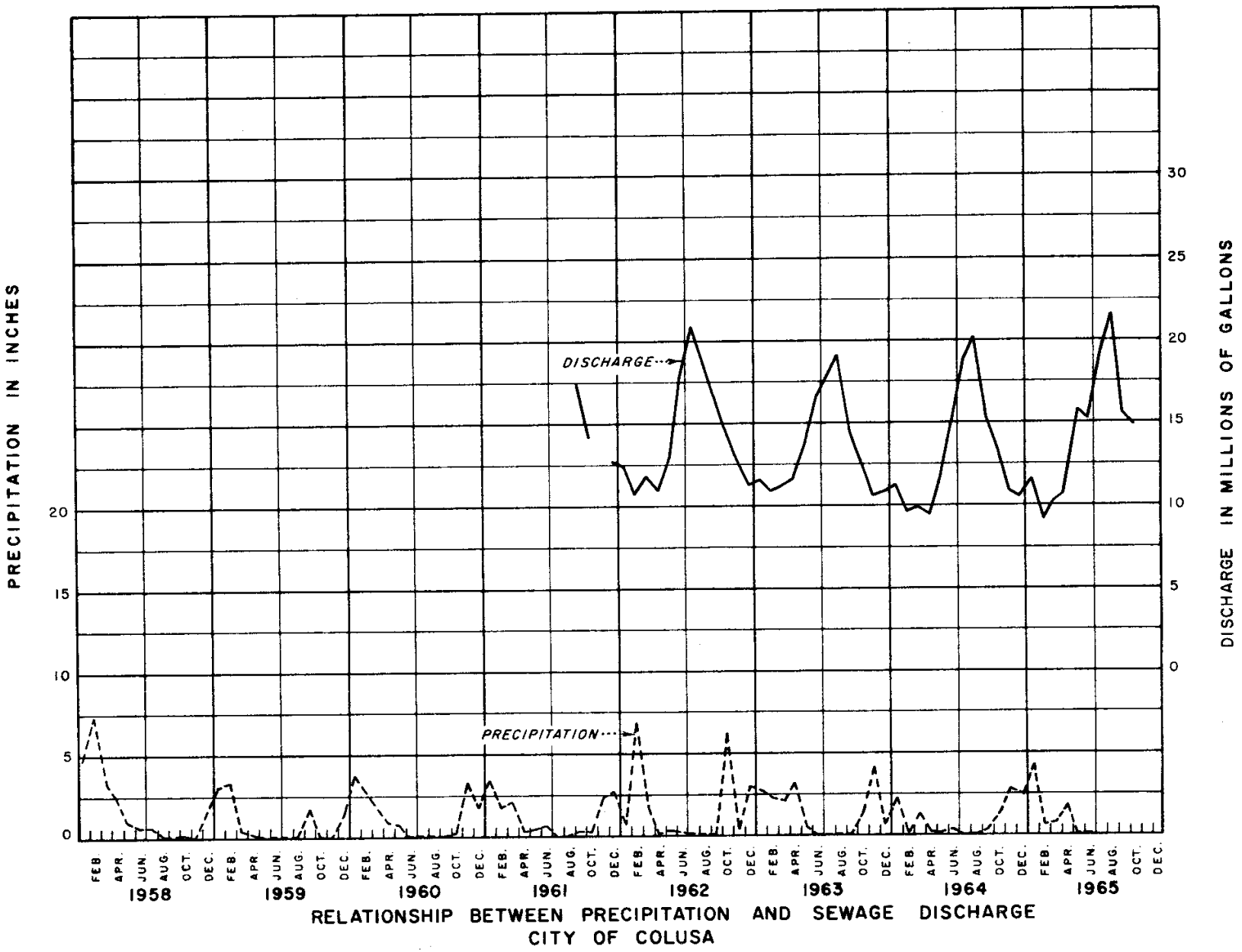
SCHEMATIC OF WASTE WATER

TREATMENT FACILITIES

CITY OF COLUSA



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT
CITY OF COLUSA



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF COLUSA

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
City of Colusa																						
Effluent from clarifier	7-20-60 / -- 24 hr	Comp.	--	- / 7.3	695	12 / 0.60	12 / 0.98	112 / 4.87	7.5 / 0.19	12 / 0.66	0 / 0.00	342 / 5.60	20 / 0.42	40 / 1.13	0.1 / 0.00	0.2	--	47	438[a]	79	0	67
Effluent from clarifier	4-26-63 / --	Grab	--	- / 8.5	---	22 / 1.10	36 / 2.96	250 / 10.87	--	--	22 / 0.73	465 / 7.62	145 / 3.02	136 / 3.83	--	--	--	--	814	203	-	72
Effluent from clarifier	1-31-64 / 1030	Grab	0.37	7.3 / 7.2	881	17 / 0.85	6.2 / 0.51	129 / 5.61	12 / 0.31	35 / 1.94	0 / 0.00	414 / 6.78	5.3 / 0.11	44 / 1.24	2.5 / 0.04	0.8	0.1 / 0.01	16	534	69	0	81
Effluent from clarifier	5-14-64 / 1300	Grab	0.41	6.8 / 6.8	965	--	--	--	--	--	0 / 0.00	268 / 4.39	--	--	1.1 / 0.02	--	--	--	578	70	-	-
Effluent from clarifier	1-14-65 / 1130	Grab	0.38	- / 7.4	901	19 / 0.95	4.2 / 0.35	110 / 4.78	14 / 0.36	29 / 1.05	0 / 0.00	426 / 6.98	17 / 0.35	43 / 1.21	3.2 / 0.05	0.7	--	--	542	63	0	74

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Colusa																						
Effluent from clarifier	7-20-60 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	43	--	--	--	--	--	14	--
Effluent from clarifier	1-31-64 1030	Grab	--	--	--	--	--	--	--	--	--	5.2	--	--	--	--	--	--	--	--	33	--
Effluent from clarifier	5-14-64 1300	Grab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28
Effluent from clarifier	1-14-65 1130	Grab	0.43	--	--	--	--	--	--	--	--	5.9	--	--	--	29	--	--	--	--	31	31

ANALYSES OF WASTE WATER
PART 3

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Colusa										
Effluent from clarifier	7-20-60 --	Comp.	--	36	--	15	--	--	--	
Effluent from clarifier	1-31-64 1030	Grab	--	--	--	--	--	--	8.9±4.7	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Colusa																				
Effluent from clarifier	1-31-64 / 1030	Grab	--	10	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	66	<5.7	≤0.29	7.0	<0.29	3.4	<1.4	<0.57	<0.29	<5.7

CITY OF CORNING

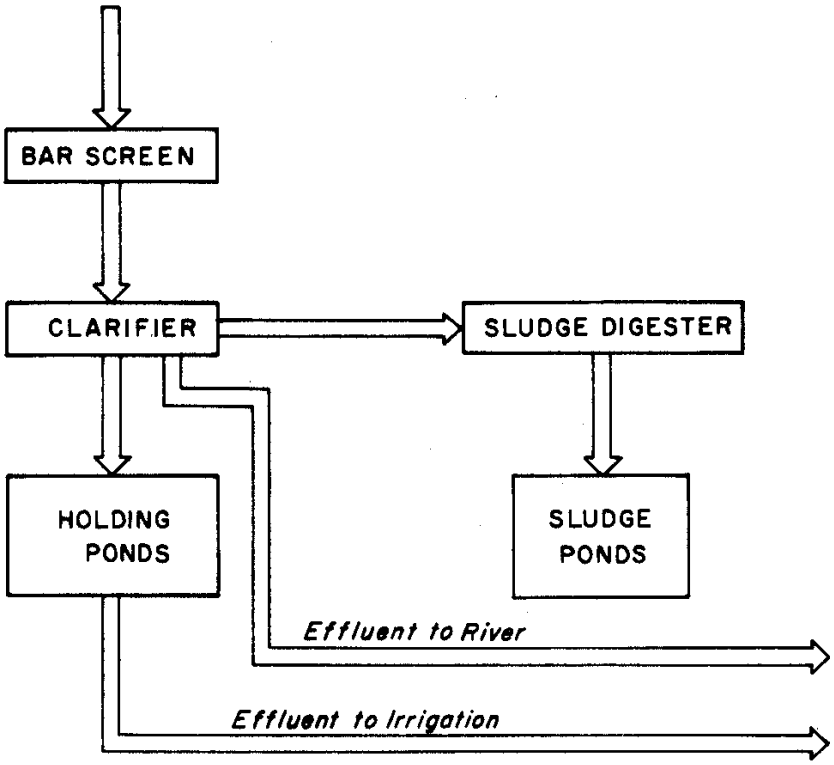
Corning is a city of 3,500 persons, located in southern Tehama County. It is 20 miles south of Red Bluff on Interstate Highway 5, and about 5 miles west of the Sacramento River. The sewage treatment plant is about 5 miles east of town on Gardiner Ferry Road at Dale Road. It is west of Kapta Slough, in the SE 1/4 of the SE 1/4 of Section 20, T24N, R2W, MDB&M.

Treatment of the waste water includes screening, clarification, and oxidation by ponding. Exact data are not available on the quantity of discharge from the Corning sewerage facilities, but weir-type measurements indicate the daily flow averaging about 0.3 million gallons per day in 1966. Effluent from the waste water treatment plant is discharged either to land for irrigation or to the Sacramento River, depending on irrigation requirements.

Analyses were made of the effluent from the Corning waste water treatment plant in May of 1963 and 1964, and in February 1965. Based on these analyses, the quality of the effluent is considered as Class 1 for irrigation purposes.

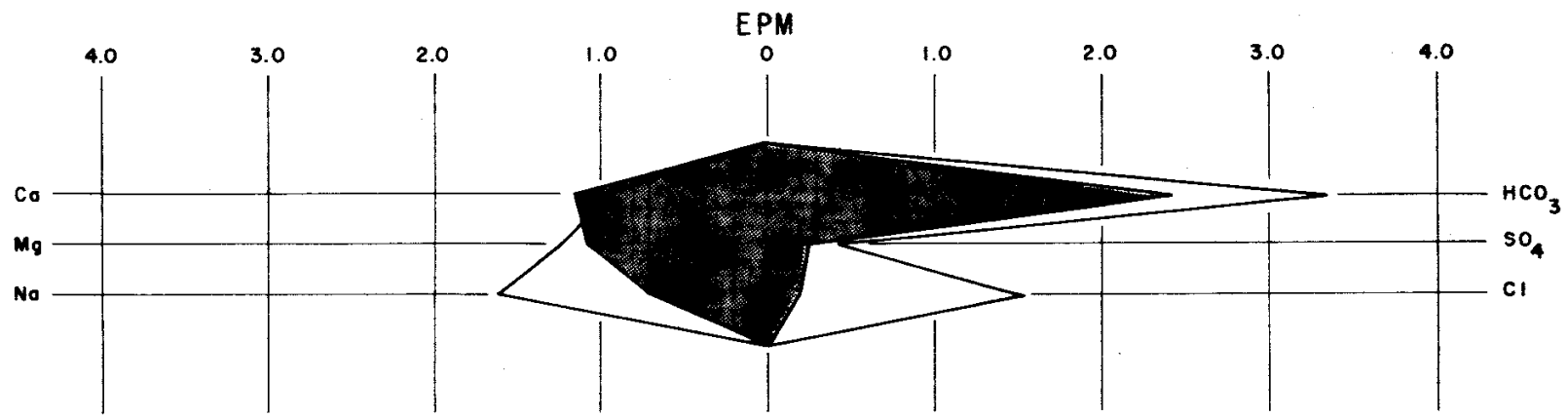
A graph on page 66 shows a comparison of analyses of the supply water for the year 1959 and of the effluent for May 1963. These analyses indicate that the increases in the concentrations of the major chemical constituents are generally less than the normal for the District.

The quality of the Corning plant effluent is within the recommended limits of the drinking water standards. It is reasonable to assume that, with proper water quality management, full utilization of the effluent can be continued.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF CORNING



WATER SUPPLY 1959

EFFLUENT MAY 1963

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF CORNING

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ mg/l (ppm) N.C.	Percent Sodium
City of Corning																						
Effluent from clarifier	5-27-63 / 0900	Grab	--	7.0 / 7.4	593	19 / 0.95	15 / 1.23	37 / 1.61	8.4 / 0.21	22 / 1.22	0 / 0.00	204 / 3.34	20 / 0.42	55 / 1.55	0.4 / 0.01	0.1	0.2 / 0.01	35	311[a]	109	0	29
Effluent from holding pond	5-13-64 / 1430	Grab	--	8.2 / 7.6	652	--	--	--	--	18 / 1.00	0 / 0.00	305 / 5.00	--	--	0.9 / 0.01	--	--	--	348	124	0	--
Effluent from clarifier	2-19-65 / 0730	Grab	0.51	- / 7.7	674	29 / 1.45	13 / 1.11	49 / 2.13	11 / 0.28	--	0 / 0.00	289 / 4.74	23 / 0.48	35 / 0.99	1.2 / 0.02	0.6	--	--	303	128	0	43

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Corning																						
Effluent from clarifier	5-27-63 0900	Grab	--	--	--	--	--	--	--	--	--	5.6	--	--	--	22	--	--	--	--	26	--
Effluent from holding pond	5-13-64 1430	Grab	--	--	--	--	--	--	--	--	--	14	--	--	--	18	--	--	--	--	--	3[illegible]
Effluent from clarifier	2-19-65 0730	Grab	0.51	--	--	--	--	--	--	--	--	9.0	--	--	--	--	--	0.3	--	--	--	[illegible]9

CENTRAL VALLEY REGION NO. 5

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Corning										
Effluent from clarifier	5-27-63 / 0900	Grab	--	--	--	--	--	--	11.1±3.6	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Corning																				
Effluent from clarifier	5-27-63 / 0900	Grab	--	11	<0.57	<0.29	<1.4	<1.4	<1.4	20	33	<5.7	<0.29	36	<0.29	2.5	<1.4	<0.57	9.7	<5.7

CITY OF CRESCENT CITY

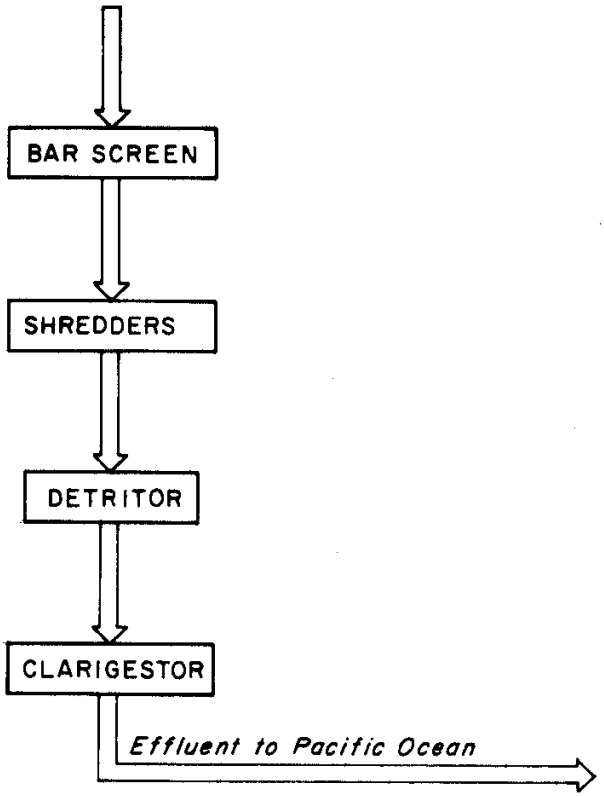
Crescent City is a city of 3,000 persons, county seat of Del Norte County. It is on U. S. Highway 101 about 20 miles south of the Oregon State line. The sewage treatment plant is in the southwest corner of the town at Battery and B streets, in the SW 1/4 of the SE 1/4 of Section 29, T16N, R1W, HB&M.

Treatment of the waste water includes screening, "shredding", detrition, and clarification. The city plans to add a chlorinator to the system. For the period July 1958 through June 1964 discharges from the waste water treatment plant averaged 0.59 million gallons per day, or 660 acre-feet per year. Effluent from the plant is discharged to the Pacific Ocean. There is no present beneficial use of the treated waste water, nor is any such use anticipated.

Representative samples of the effluent from the Crescent City waste water treatment plant were collected in May and June of 1961. Based on analyses of these samples, the quality of the effluent is considered as Class 1 for irrigation purposes.

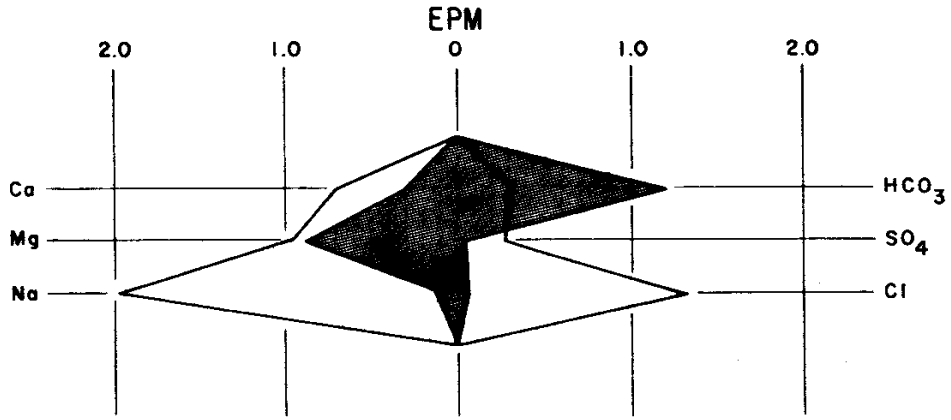
The graph on page 73 shows a comparison of analyses of the supply water to the city for the year 1959 and of the effluent for May 1961. These analyses indicate that the increases in the concentrations of major chemical constituents vary quite widely. The increment values are high for magnesium, bicarbonate, and nitrate; low for calcium, sulfate, and chloride; and that for sodium is equal to the normal.

The mineral quality of the effluent from the Crescent City plant meets the recommended limits of drinking water standards. Although the treated water may be of an acceptable quality for reuse, it does not appear that, in the immediate future, any beneficial use of the effluent will be made.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF CRESCENT CITY

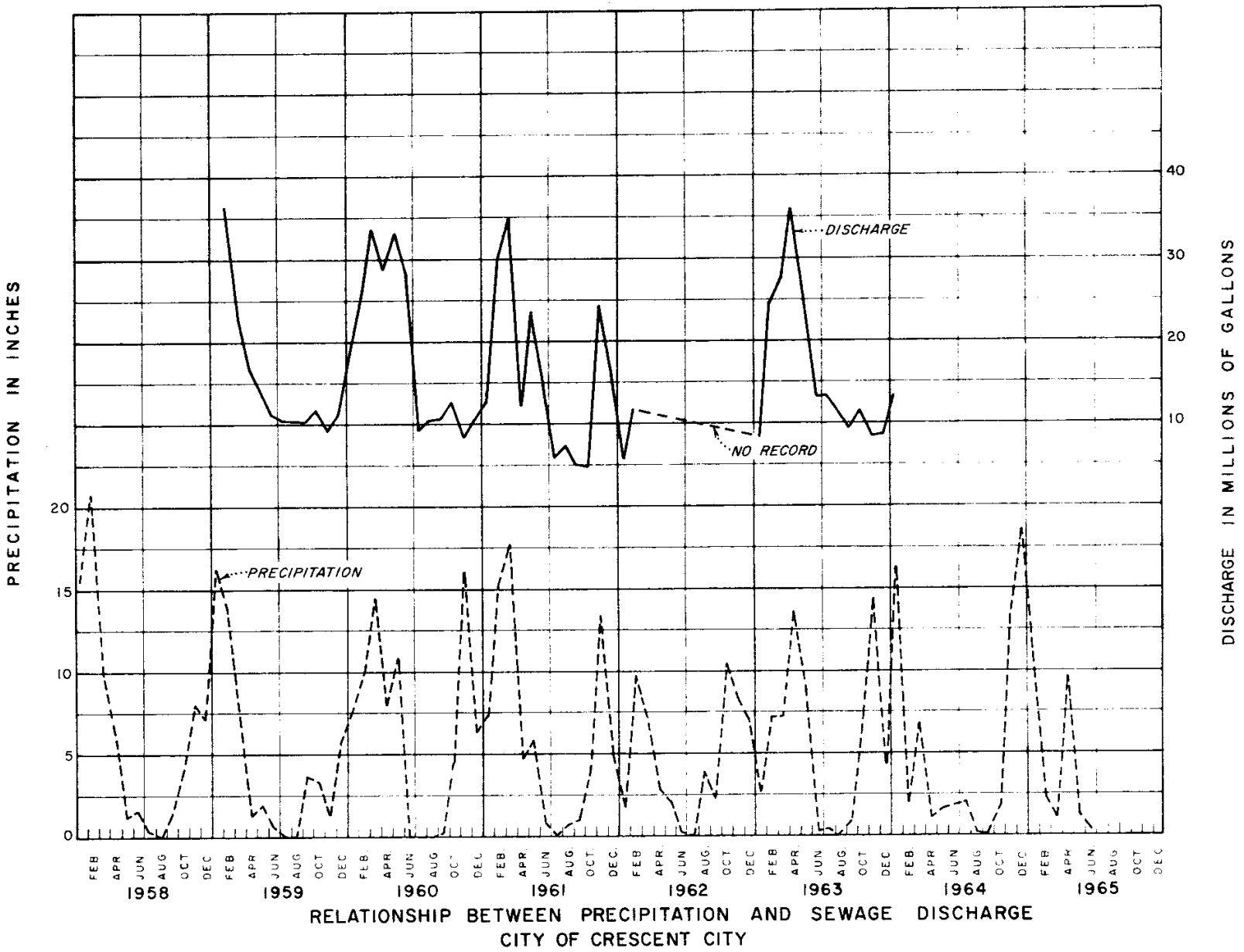


WATER SUPPLY 1959

EFFLUENT MAY 1961

SUPPLY WATER AS COMPARED WITH TREATMENT PLANT EFFLUENT

CITY OF CRESCENT CITY



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF CRESCENT CITY

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents in milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
City of Crescent City																						
Effluent from clarifier	5-10-61 / 1330	Grab	--	- / 4.9	443	14 / 0.70	11 / 0.94	45 / 1.96	20 / 0.51	1.9 / 0.10	0 / 0.00	21 / 0.34	14 / 0.29	47 / 1.32	7.4 / 0.12	0.3	0.3 / 0.02	19	191[a]	32	65	46
Effluent from clarifier	6-21-61 / 22 hr	Comp.	--	- / 6.7	515	11 / 0.55	13 / 1.09	44 / 1.91	11 / 0.28	21 / 1.16	0 / 0.00	183 / 3.00	4.6 / 0.10	39 / 1.10	0.9 / 0.01	0.5	0.1 / 0.00	22	260[a]	80	0	38

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Crescent City																						
Effluent from clarifier	5-10-61 / 1330	Grab	--	--	--	--	--	--	--	--	--	1.7	--	--	52.8	--	--	--	--	--	[illegible]	--
Effluent from clarifier	6-21-61 / --	Comp.	--	0.34	0.00	0.00	0.15	0.06	0.00	0.11	0.17	3.7	--	--	259	--	--	--	--	--	24	--

ANALYSES OF WASTE WATER
PART 3

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Crescent City										
Effluent from clarifier	5-10-61 / 1330	Grab	--	166	--	27	--	--	--	
Effluent from clarifier	6-21-61 / --	Comp.	--	64	--	60	--	--	9.0±4.0	

CITY OF DUNSMUIR

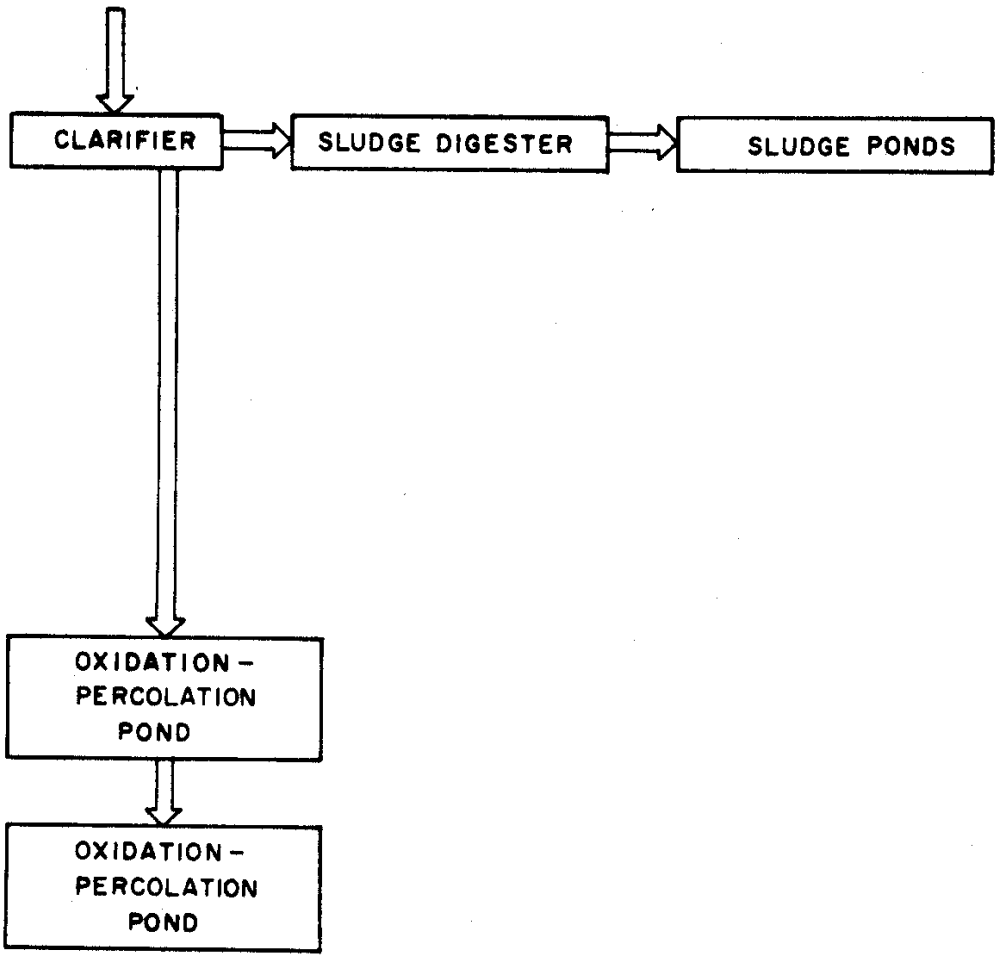
Dunsmuir is a city of 3,000 persons in extreme southern Siskiyou County. It is on the Sacramento River and Interstate Highway 5. The sewage treatment plant is located south of town in Shasta County about 0.5 miles south of the county line and adjacent to the Sacramento River in the NW 1/4 of the NW 1/4 of Section 1, T38N, R4W, MDB&M.

Treatment of the waste water includes clarification and oxidation by ponding. For the period July 1960 through June 1964 discharges from the waste water treatment plant averaged 0.36 million gallons per day or 400 acre-feet per year. The effluent is retained on property controlled by the City of Dunsmuir and dissipated by evaporation and infiltration to ground water.

A representative sample of the effluent from Dunsmuir waste water treatment plant was collected in June 1963. Based on analysis of this sample the quality of the effluent is considered as Class 1 for irrigation purposes.

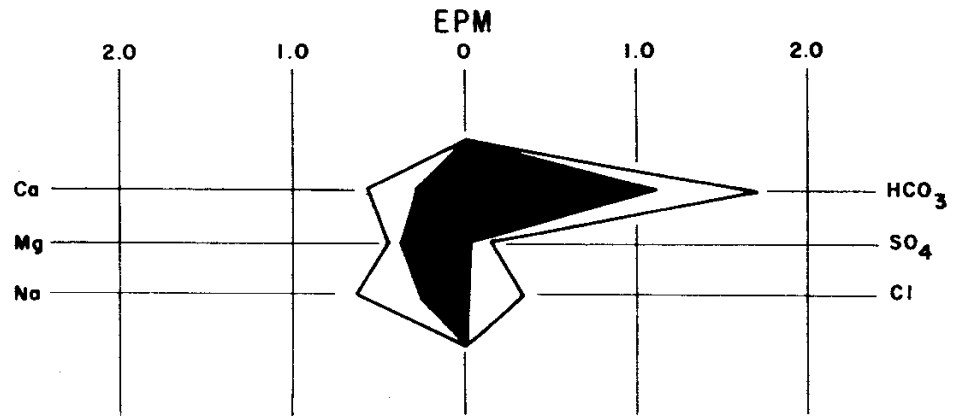
The graph on page 80 shows a comparison of analyses of the supply water for the year 1961 and of the effluent for June 1963. These analyses indicate that the increments for the major chemical constituents are about normal for the area.

The quality of the Dunsmuir effluent is within the recommended limits of the drinking water standards. Although no use of water from this plant has been made, it is not unreasonable to assume that, with good management, some beneficial uses could be derived.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF DUNSMUIR

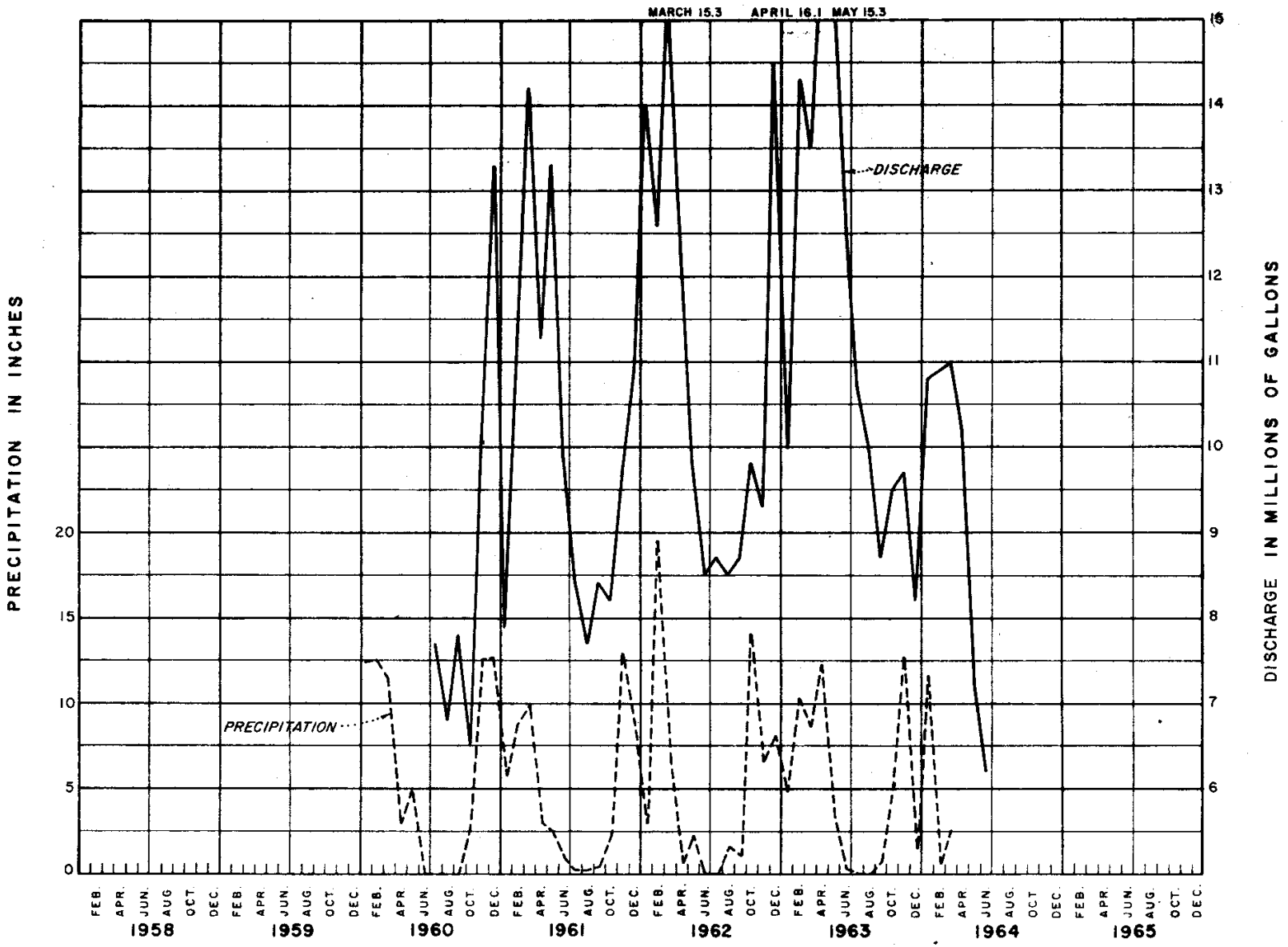


WATER SUPPLY 1961

EFFLUENT JUNE 1963

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF DUNSMUIR



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF DUNSMUIR

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents (milligrams per liter (ppm) / equivalents per million): Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
Dunsmuir																						
Effluent from pond #4	6-12-63 / 1600	Grab	--	7.0 / 7.4	222	12 / 0.60	5.6 / 0.46	15 / 0.65	4.0 / 0.10	7.5 / 0.54	0 / 0.00	102 / 1.67	6.4 / 0.13	11 / 0.31	0.5 / 0.01	0.0	0.0 / 0.00	32	146[a]	53	0	28

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Dunsmuir																						
Effluent from Pond #4	6-12-63 / 1600	Grab	--	--	--	--	--	--	--	--	--	1.8	--	--	--	7.5	--	--	--	--	7.8	--

CENTRAL VALLEY REGION NO. 5

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Dunsmuir										
Effluent from Pond #4	6-12-63 / 1600	Grab	--	--	--	--	--	--	6.8±3.7	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Dunsmuir																				
Effluent from Pond #4	6-12-63 / 1600	Grab	--	7.7	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	76	<5.7	<0.29	19	<0.29	4.3	<1.4	<1.4	7.3	<5.7

CITY OF EUREKA

Eureka is a city of 28,200 persons adjacent to Humboldt Bay in Humboldt County. Three sewage treatment plants serve the city. For this report, only the Murray Street plant is discussed. The sewage treatment plant is on the west side of town, north of Murray Street and west of U. S. Highway 101, at the throat of Humboldt Bay, in the NW 1/4 of the NE 1/4 of Section 28, T5N, R1W, HB&M.

Treatment of the waste water includes clarification and chlorination. Comminution of the inflow takes place before it reaches the Murray Street plant. For the period July 1957 through June 1965, discharges from this plant averaged 2.39 million gallons per day or 2,670 acre-feet per year. For the period July 1965 through December 1966 the flow averaged 2.42 million gallons per day or 2,700 acre-feet per year.

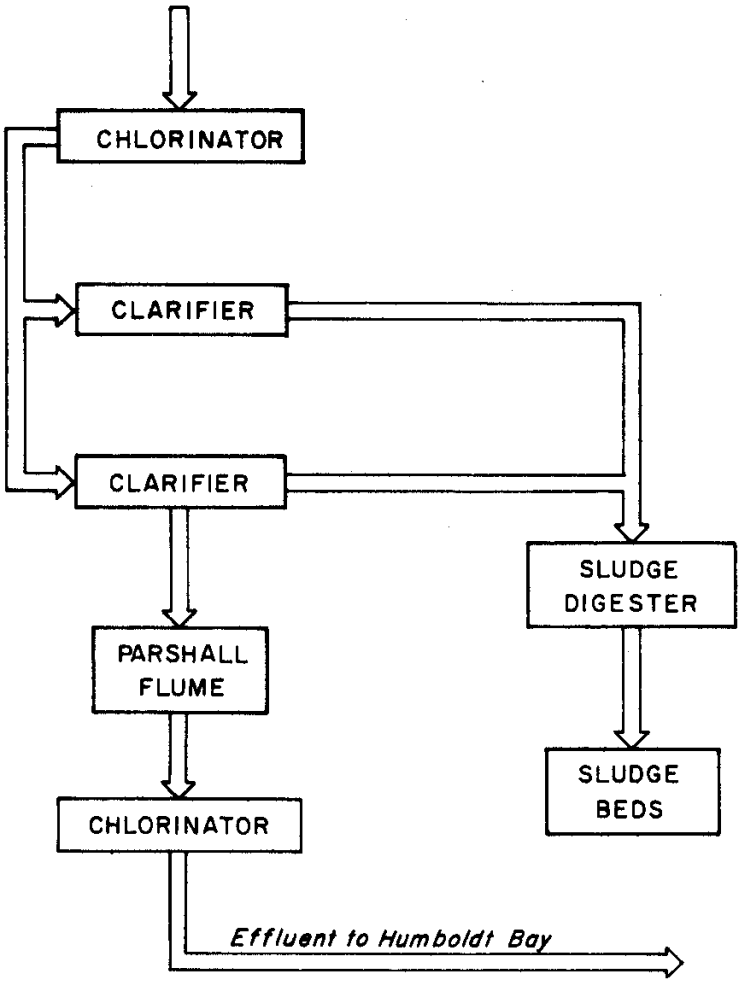
Effluent from the plant is discharged to the salt waters of Humboldt Bay. Previous to May 1965, the City had shown an interest in utilization of reclaimed water, but no actions have been initiated to develop a program to take advantage of this presently wasted resource.

Analyses were made of the effluent from the Murray Street plant at periodic intervals from May 1959 through May 1965. Based on these analyses, the quality of the effluent is generally Class 3 for irrigation purposes, due to excessively high concentrations of chloride, which range up to more than 600 parts per million.

The graph on page 89 shows a comparison of analyses of the supply water for the year 1961 and of the effluent for June 1961. These analyses indicate that the increments for the major chemical constituents are generally greater than for most sewerage facilities considered in this

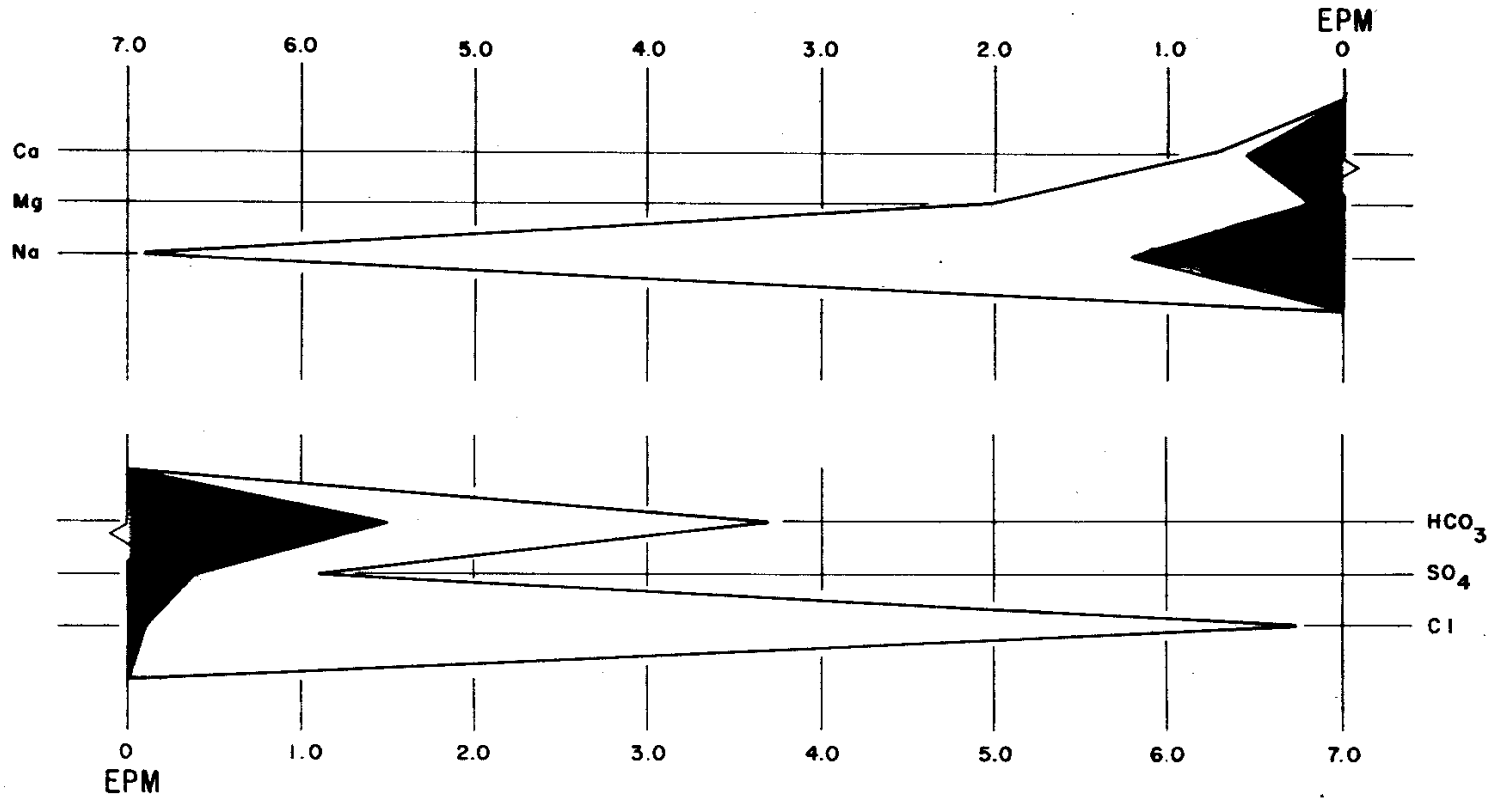
report. The increment values for chloride and sodium are most notably excessive. This might indicate the influence of salt or brackish waters.

The mineral quality of the supply water is within the recommended limits of the drinking water standards. However, due to the increased concentrations of chloride and total dissolved solids, the effluent exceeds the recommended limits of the standards. It appears that, if use of the effluent for beneficial purposes were to be initiated, water quality management would have to be effected prior to such use.



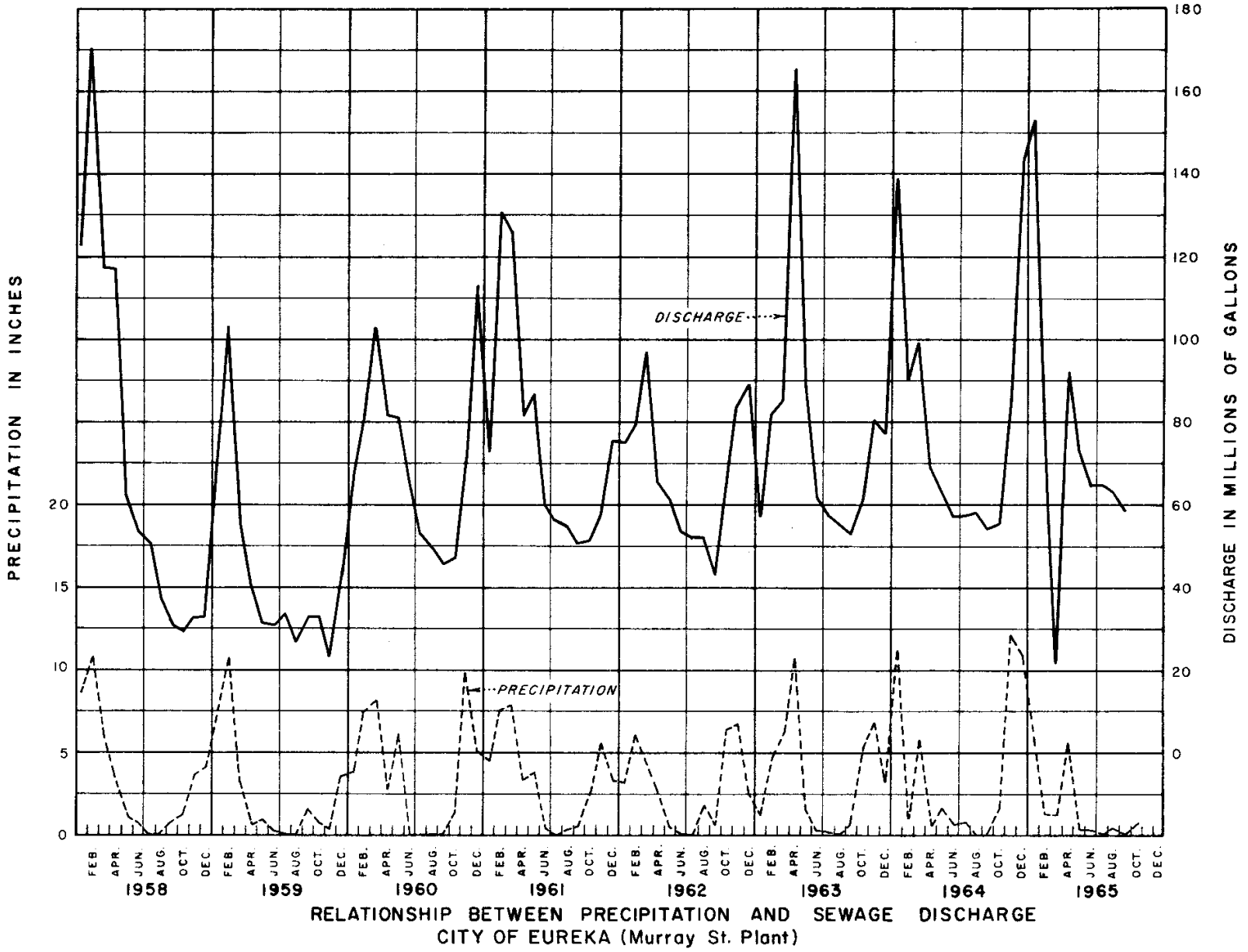
SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF EUREKA *(Murray Street Plant)*



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF EUREKA *(Murray Street Plant)*



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF EUREKA (Murray St. Plant)

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents in milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
City of Eureka (Murray St. Plant)																						
Final effluent	5-13-59 / 8 hr.	Comp.	--	- / 7.2	965	19 / 0.95	15 / 1.23	111 / 4.83	1.1 / 0.03	35 / 1.94	0 / 0.00	207 / 3.39	46 / 0.96	156 / 4.40	1.7 / 0.03	0.33	1.1 / 0.06	21	510[a]	109	0	54
Final effluent	6-13-61 / 24 hr.	Comp.	--	- / 7.2	1270	14 / 0.70	24 / 2.02	158 / 6.87	14 / 0.36	31 / 1.72	0 / 0.00	226 / 3.70	52 / 1.08	239 / 6.74	0.1 / 0.00	0.4	0.2 / 0.01	13	456[a]	136	0	59
Final effluent	8-15-62 / 8 hr.	Comp.	--	7.2 / 7.5	2040	33 / 1.65	36 / 2.93	284 / 12.35	22 / 0.56	32 / 1.77	0 / 0.00	225 / 3.69	93 / 1.77	471 / 13.28	0.6 / 0.01	0.4	0.1 / 0.03	15	1092[a]	389	49	64
Final effluent	8-28-63 / 1100	Grab	--	6.9 / 7.6	1600	29 / 1.45	23 / 1.93	192 / 8.35	20 / 0.51	34 / 1.38	0 / 0.00	261 / 4.28	23 / 0.49	310 / 8.70	0.8 / 0.01	0.4	0.1 / 0.00	15	791	169	0	69
Final effluent	5-27-65 / 0745	Grab	2.2	6.7 / 7.7	2410	35 / 1.75	43 / 3.54	351 / 15.27	24 / 0.61	--	0 / 0.00	128 / 2.10	102 / 2.12	615 / 17.35	0.0 / 0.00	0.3	--	--	1330	260	160	75

(a) Sum of analyzed constituents

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Eureka (Murray St. Plant)																						
Final effluent	5-13-59 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	54	--	--	--	--	--	25	--
Final effluent	6-13-61 --	Comp.	--	--	--	--	--	--	--	--	--	5.7	--	--	74	--	--	--	--	--	24	--
Final effluent	8-15-62 --	Comp.	--	--	--	--	--	--	--	--	--	3.9	--	--	--	--	--	--	--	--	--	33
Final effluent	8-28-63 1100	Grab	--	--	--	--	--	--	--	--	--	4.3	--	--	--	--	--	--	--	--	29	--
Final effluent	5-27-65 0745	Grab	2.2	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	0.0	--	18	--	14

NORTH COASTAL REGION NO. 1

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Eureka (Murray St. Plant)										
Final effluent	5-13-59 --	Comp.	--	34	--	54.7	0.30±0.29	12.64±4.6	--	
Final effluent	6-13-61 --	Comp.	--	56	--	35	--	--	12.9±3.3	
Final effluent	8-15-62 --	Comp.	--	--	--	--	--	--	9.4±3.5	
Final effluent	8-28-63 1100	Grab	--	--	--	--	--	--	21.7±5.1	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Eureka (Murray St. Plant)																				
Final effluent	8-15-62 --	Comp.	--	10	<2.0	<1.0	<5.0	<5.0	<5.0	<5.0	>400	<20	<1.0	<5.0	<1.0	9.0	<5.0	<2.0	<1.0	<20
Final effluent	8-28-63 1100	Grab	--	9.7	<0.57	<0.29	39	<1.4	<1.4	30	>25	<5.7	<0.29	50	≤0.29	5.7	≤1.4	<0.57	2.9	<5.7

TOWN OF FORTUNA

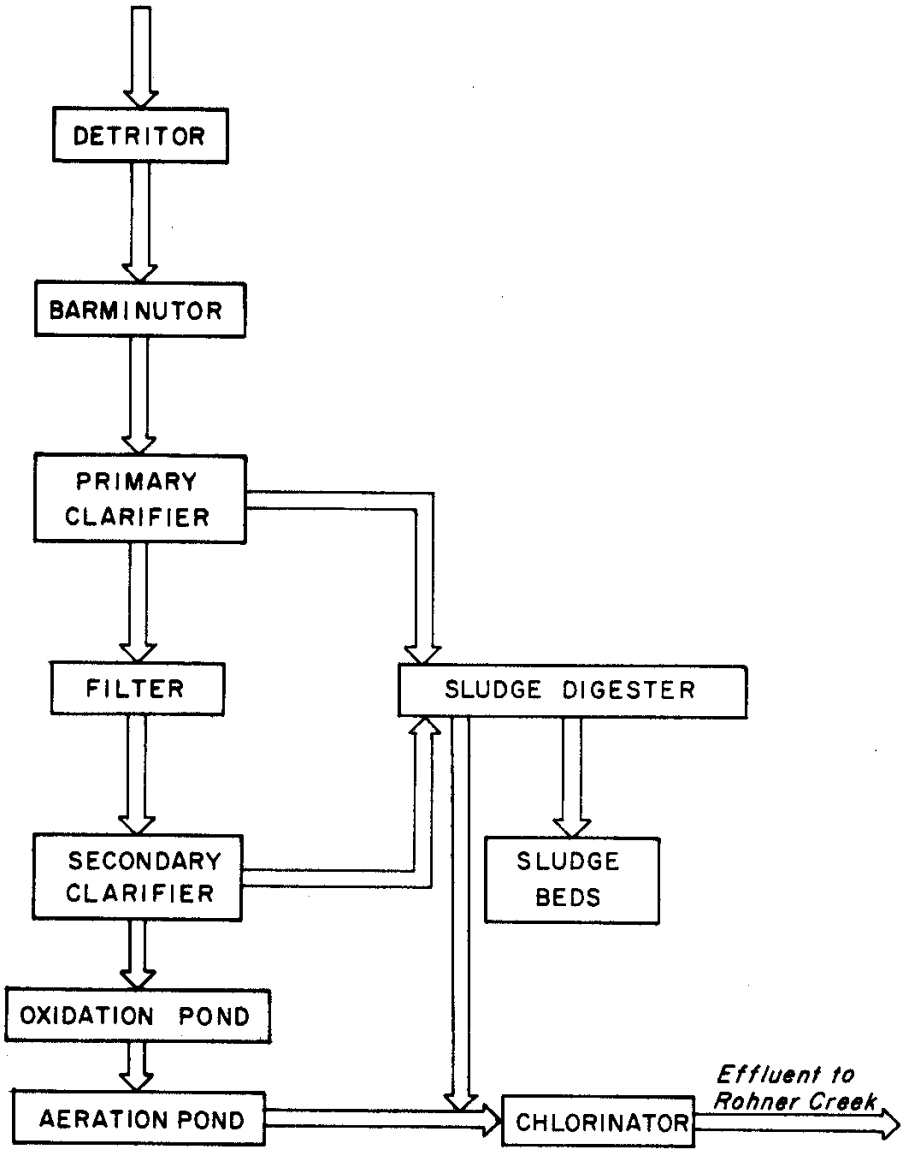
The Town of Fortuna, Humboldt County, is a city of 3,900 persons, overlooking the Eel River flood plain about 10 miles above the mouth. The sewage treatment plant is about 0.5 miles south of the town, north of Rohner Creek, and west of U. S. Highway 101, in the NW 1/4 of the NW 1/4 of Section 2, T2N, R1W, HB&M.

Treatment of the waste water includes detrition, barminution, primary clarification, filtration and secondary clarification. No data are available on the quantity of flow for the Fortuna waste water discharges. As of April 1967 there were no indications of any planned use of the treated water which at present is discharged into Rohner Creek.

Analyses were made of samples of the effluent from the Fortuna waste water treatment plant collected in June 1961, February 1964, and May 1965. Based on these analyses, the quality of the effluent is generally considered as Class 1 for irrigation purposes.

No data are available on the quality of waters supplied to the Town of Fortuna. Hence, no comparison of supply water and effluent can be made.

The quality of the Fortuna plant effluent is generally within the recommended limits of the drinking water standards. The effluent from the Fortuna treatment plant, could, no doubt, be beneficially used if a market for the water were developed and adequate management controls are implemented.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF FORTUNA

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
Town of Fortuna																						
Final effluent	6-22-61 / 24 hr	Comp	--	/ 7.7	893	13 / 0.90	21 / 1.76	93 / 4.04	16 / 0.41	36 / 2.00	0 / 0.00	404 / 6.62	30 / 0.62	47 / 1.32	1.6 / 0.03	0.6	0.2 / 0.01	35	461	133	0	44
Final effluent	2-6-64 / 1030	Grab	--	8.5 / 7.8	575	17 / 0.85	12 / 0.99	70 / 3.04	8.2 / 0.21	12 / 0.66	0 / 0.00	207 / 3.39	14 / 0.29	42 / 1.18	13 / 0.21	0.8	0.6 / 0.03	24	361	86	0	53
Final effluent	5-27-65 / 1000	Grab	0.41	8.2 / 7.2	770	16 / 0.80	22 / 1.80	73 / 3.21	16 / 0.41	--	0 / 0.00	183 / 3.00	8. / 0.[illegible]	32 / 1.13	--	0.2	--	--	[illegible]	130	0	[illegible]

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Alumi-num (Al)	Ar-senic (As)	Chromi-um (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manga-nese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfact-ants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammo-nia (N)	Ni-trite (N)	Ni-trate (N)	Organic (N)	Ammonia and organic (N)	Ortho phos-phate (PO_4)	Total phos-phate
Town of Fortuna																						
Final effluent	2-6-64 / 1030	Grab	--	--	--	--	--	--	--	--	--	1.0	--	--	--	--	--	--	--	--	9.4	--
Final effluent	5-27-65 / 1000	Grab	0.41	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	1.6	--	47	--	29

NORTH COASTAL REGION NO. 1

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (m g d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Town of Fortuna										
Final effluent	2-6-64 / 1030	Grab	--	--	--	--	--	--	2.0±4.6	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Town of Fortuna																				
Final effluent	2-6-64 / 1030	Grab	--	1.6	<0.57	<0.29	<1.4	<1.4	<1.4	9.7	25	<5.7	<0.29	54	<0.29	7.4	<1.4	8.3	0.51	<0.7

HERLONG, SIERRA ARMY DEPOT

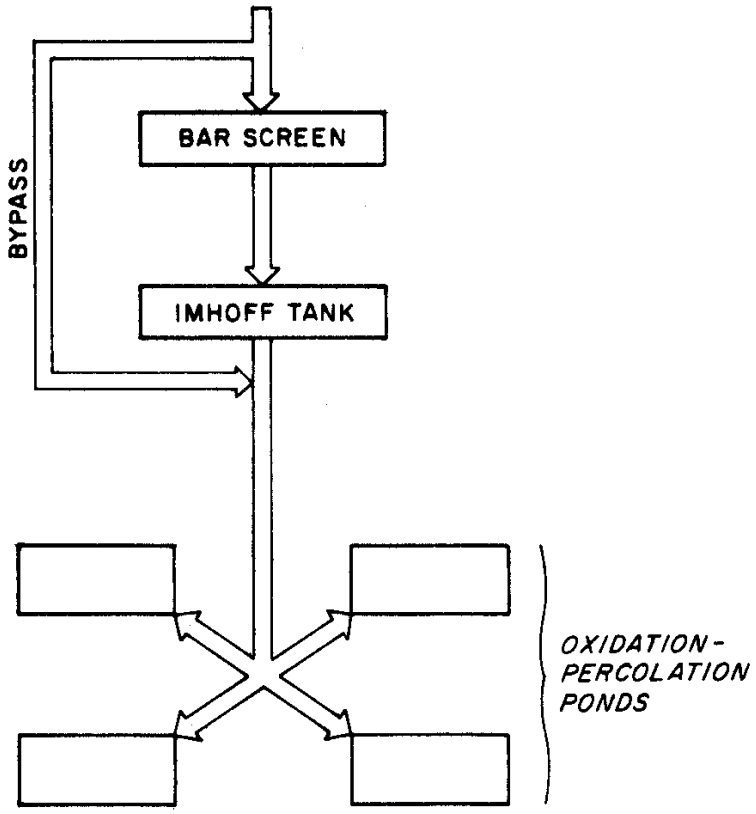
Herlong is an unincorporated community of 1,500 persons in southeastern Lassen County. It is within the army's Sierra Army Depot about 40 miles southeast of Susanville. The sewage treatment plant, which serves both the community and the Sierra Army Depot, is located about 1 mile northwest of the town, north of the main access road. The site is in the NW 1/4 of Section 35, T27N, R16E, MDB&M.

Treatment of the waste water includes a bar screen, Imhoff tank and oxidation ponds. For the period July 1958 through June 1965, the discharge averaged 0.26 million gallons per day or 290 acre-feet per year. In the period January 1966 through March 1967, the average daily flow was 0.22 million gallons per day. The effluent is disposed to ponds for evaporation and infiltration. As of April 1967, no beneficial use was being made of the effluent.

Analyses were made of the effluent from the Herlong waste water treatment plant in August 1963 and February 1965. Based on these analyses, the quality of the effluent is Class 2 for irrigation purposes. This is due to a high total dissolved mineral concentration, and a boron concentration of 1.6 ppm in the August 1963 analysis.

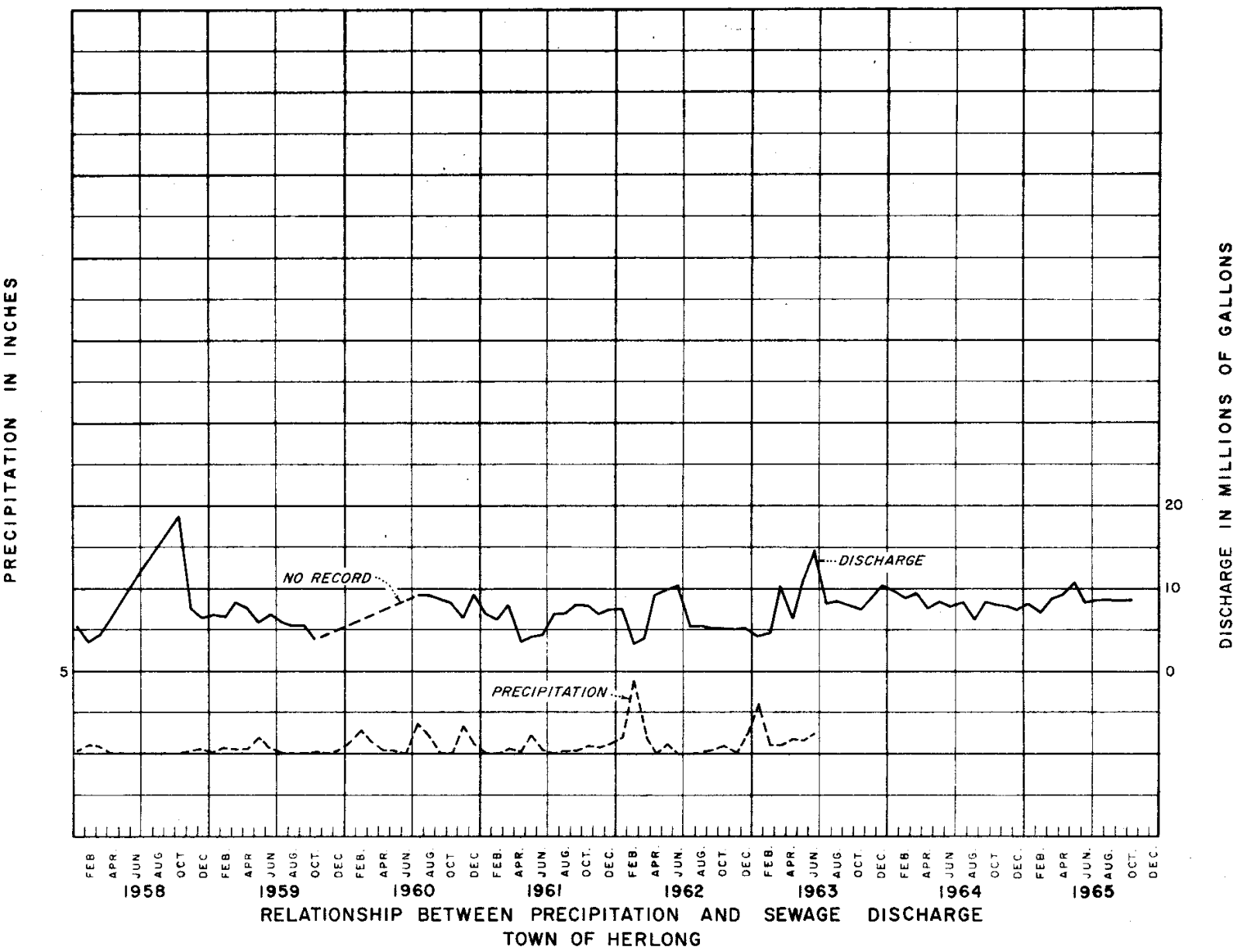
The Department has no data on the quality of the Herlong supply waters. The mineral pickup due to use and treatment is therefore unknown.

The quality of the effluent from this plant is not considered acceptable according to the drinking water standards because of excess concentrations of nitrate and total dissolved solids. There is no doubt that some beneficial use could be made of the effluent from the Herlong plant; but this will not occur as long as no actual demand exists for reclaimed water in the area.



SCEMATIC OF WASTE WATER
TREATMENT FACILITIES

TOWN OF HERLONG



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
TOWN OF HERLONG

ANALYSES OF WASTE WATER
PART I

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
Herlong (Sierra Army Depot)																						
Dike at center of ponds	8-21-63 / 1600	Grab	--	7.0 / 7.7	1190	47 / 2.34	27 / 2.24	147 / 6.39	15 / 0.38	26 / 1.44	0 / 0.00	156 / 2.56	186 / 3.87	87 / 2.45	94 / 1.52	1.6	0.4 / 0.02	24	840	229	101	50
Final oxidation pond	2-5-65 / 0730	Grab	0.26	- / 9.4	803	--	--	--	--	--	30 / 1.00	86 / 1.41	--	52 / 1.47	0.6 / 0.01	--	--	--	[illegible]	139	--	--

ANALYSES OF WASTE WATER
PART 2

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Herlong (Sierra Army Depot)																						
Dike at center of ponds	8-21-63 / 1600	Grab	--	--	--	--	--	--	--	--	--	2.4	--	--	--	--	--	--	--	--	19	--
Final oxidation pond	2-5-65 / 0730	Grab	0.26	--	--	--	--	--	--	--	--	4.5	--	--	--	--	--	--	--	--	--	5.7

ANALYSES OF WASTE WATER
PART 3

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Herlong (Sierra Army Depot)										
Dike at center of ponds	8-21-63 / 1600	Grab	--	--	--	--	--	--	19.1±5.0	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Herlong (Sierra Army Depot)																				
Dike at center of ponds	8-21-63 / 1600	Grab	--	1.9	<0.57	<0.29	<1.4	<1.4	<1.4	56	39	<3.7	<0.29	>150	73	3.4	13	<0.57	1.1	<3.7

TOWN OF MT. SHASTA

The Town of Mt. Shasta is a town of 2,500 persons in southern Siskiyou County. It is about 12 miles southwest of the mountain for which it is named, near the head of the Sacramento River basin. The sewage treatment plant is about 2 miles southwest of town at the end of Valley Road, southeast of Cold Creek, in the NW 1/4 of the SW 1/4 of Section 28, T4ON, R4W, MDB&M.

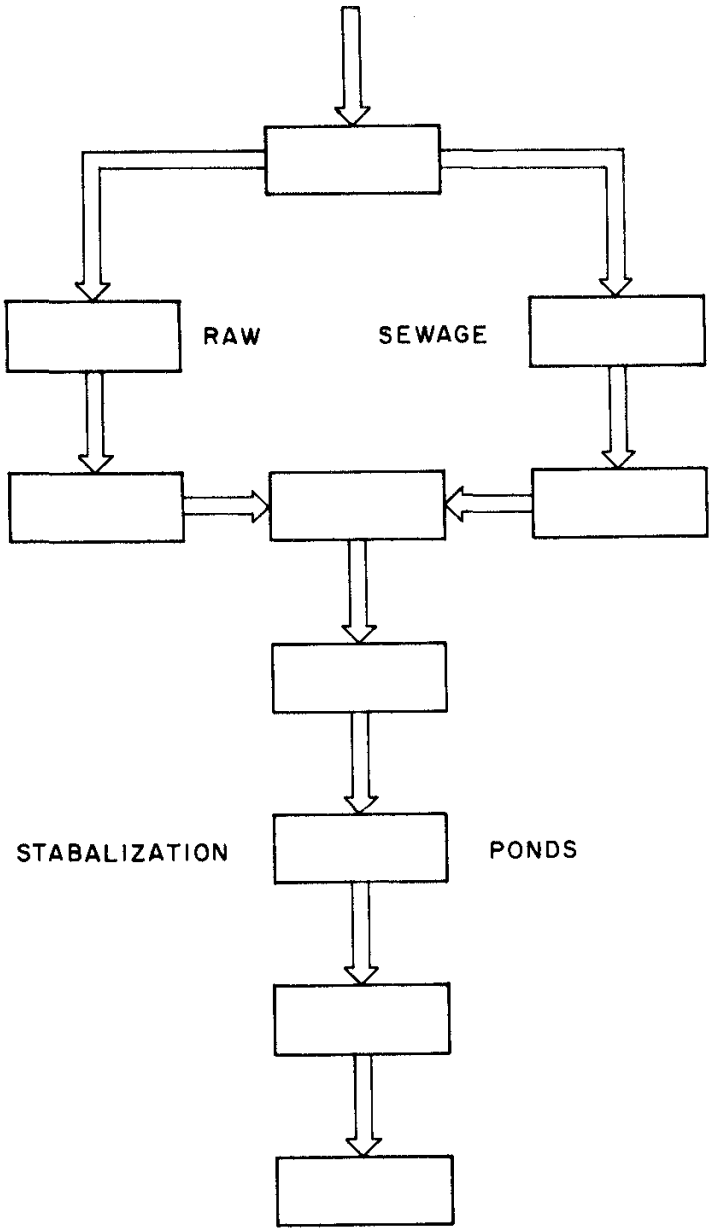
Treatment of the waste waters is by means of raw sewage stabilization ponds. At times of low flow, only two of four ponds are used. Discharge from the system is to the Sacramento River. The average flow through the system is estimated to be about 0.6 million gallons per day or 670 acre-feet per year. Some water is lost by evaporation and infiltration to the underlying ground water. No program has been considered for using reclaimed water in the vicinity of the treatment plant. Concurrent with the construction of Box Canyon Dam new ponds to replace the present ones are being constructed about a half mile southeast of the former site.

Analyses were made of the effluent from the Mt. Shasta waste water treatment plant in June 1963 and February 1965. Based on these analyses, the quality of the effluent is considered Class 1 for irrigation purposes.

The graph on page 111 compares analyses of the supply water for the year 1959 and of the effluent for June 1963. These analyses indicate that the increases in the concentrations of the major chemical constituents are at or less than the normal for the area of this study.

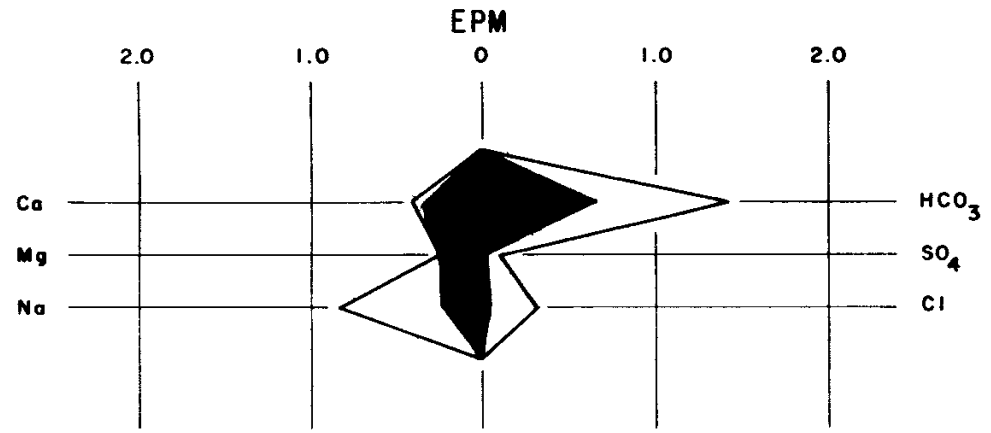
The quality of the effluent from this plant is within the limits of the drinking water standards. It is reasonable to believe that the

effluent from this facility could be beneficially used if a need for reclaimed water in the area were developed.



SCHEMATICS OF WASTE WATER
TREATMENT FACILITIES

TOWN OF MT. SHASTA



WATER SUPPLY 1959

EFFLUENT JUNE 1963

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

TOWN OF MT. SHASTA

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents in milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ (ppm): Total	Hardness as $CaCO_3$ (ppm): N.C.	Percent Sodium
Town of Mt. Shasta																						
Discharge from Pond #5	6-12-63 / 1100	Grab	--	- / 7.3	224	8.3 / 0.41	2.8 / 0.23	19 / 0.83	2.4 / 0.14	6.7 / 0.48	0 / 0.00	89 / 1.46	5.1 / 0.11	12 / 0.34	1.8 / 0.03	0.1	0.1 / 0.00	31	146[a]	37	0	19
Discharge from Pond #8	2-18-65 / 1410	Grab	0.29	- / 7.0	222	--	--	--	--	--	0 / 0.00	91 / 1.49	--	16 / 0.42	1.8 / 0.03	--	--	--	132	48	--	--

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Town of Mt. Shasta																						
Discharge from Pond #5	6-12-63 / 1100	Grab	--	--	--	--	--	--	--	--	--	1.2	--	--	--	6.7	--	--	--	--	9.4	--
Discharge from Pond #8	2-18-65 / 1410	Grab	0.29	--	--	--	--	--	--	--	--	2.3	--	--	--	--	--	0.4	--	--	--	1?

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Town of Mt. Shasta																				
Discharge from Pond #5	6-12-63 / 1100	Grab	--	14	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	76	<5.7	<0.29	25	<0.29	2.4	<1.4	<0.57	8.9	<5.7

CITY OF ORLAND

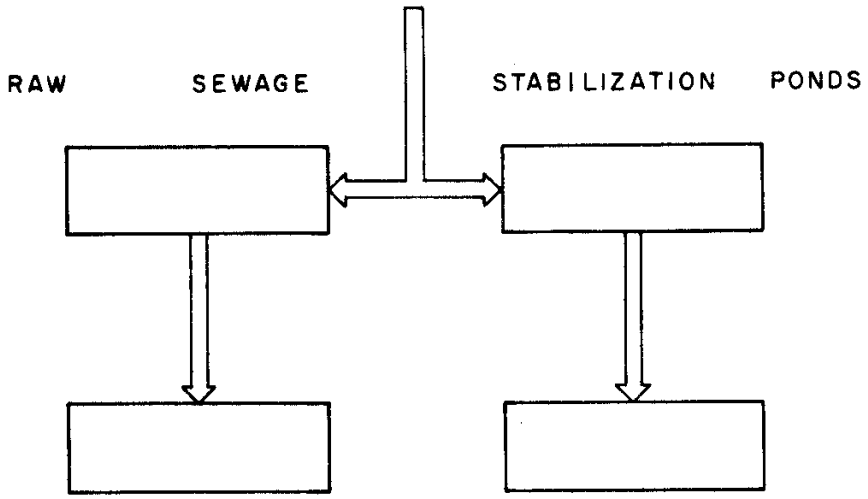
Orland is a city of 3,000 persons in northeastern Glenn County. The town is on Interstate Highway 5, 16 miles north of Willows, and about 15 miles west of the Sacramento River. The sewage treatment plant is about 2 miles southeast of the town, on the south side of Sunset Road, west of the airport, in the NW 1/4 of the NW 1/4 of Section 36, T22N, R3W, MDB&M.

Treatment of the waste water is by raw sewage stabilization. No data are available on quantity of flow for the Orland facilities. Excess waters are disposed of by evaporation and infiltration to the underlying ground water.

Analyses were made of the effluent from the Orland facilities periodically from December 1959 through April 1965. Based on these analyses, the quality of the effluent is generally considered as Class 2 for irrigation purposes.

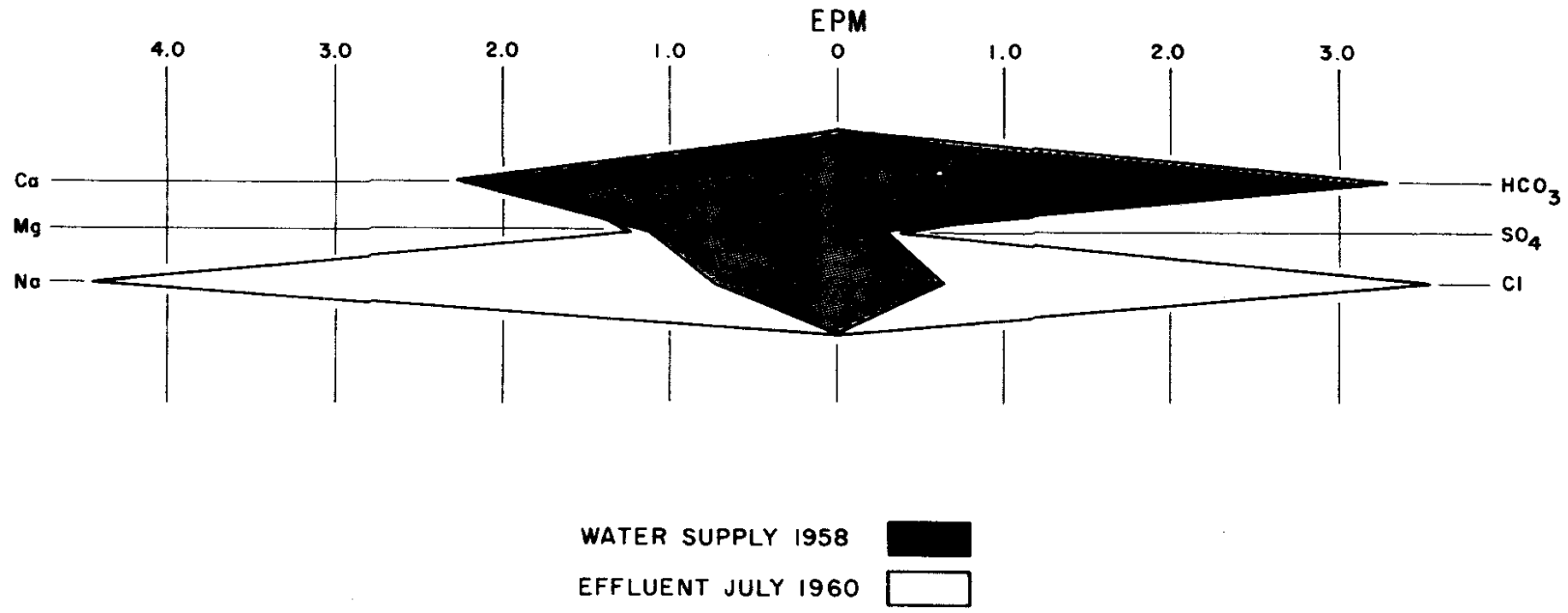
The graph on page 117 compares analyses of the supply water for the year 1958 and of the effluent for July 1960. These analyses indicate that the increments for sodium and chloride are greater than the median values for all sewerage facilities considered in the Northern District. The increment for the remaining of the major chemical constituent are less than the median values. The increases in sodium and chloride, accompanied by a reduction in total hardness suggests a considerable influence from water softening equipment.

With the exception of the total dissolved solids, the quality of the effluent is within the recommended limits of the drinking water standards. With proper management it is conceivable that all available effluent from the Orland facilities could be beneficially used.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF ORLAND



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF ORLAND

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
City of Orland																						
Effluent from ponds	12-16-59 / --	--	--	--	1270	--	--	192 / 8.38	--	--	--	--	--	255 / 7.19	--	1.6	--	--	--	--	-	--
Ponds (plant abandoned)	7-21-60 / --	Comp.	--	- / 9.2	767	37 / 1.85	15 / 1.27	103 / 4.48	9.0 / 0.23	1.4 / 0.08	54 / 1.80	129 / 2.11	18 / 0.37	125 / 3.52	0.2 / 0.00	0.3	--	23	403[a]	156	50	57
Effluent from ponds	3-12-63 / 1400	--	1.4	7.0 / 7.1	727	--	--	--	--	--	--	--	--	97 / 2.74	--	--	--	--	---	--	-	---
Influent to ponds	5-27-63 / 1400	Grab	--	- / 8.5	638	36 / 1.80	14 / 1.20	72 / 3.13	5.4 / 0.14	0.2 / 0.01	3 / 0.10	215 / 3.62	19 / 0.40	83 / 2.34	0.0 / 0.00	0.2	0.1 / 0.00	24	365[a]	150	0	50
Influent to ponds	5-13-64 / 1700	Grab	--	8.4 / 8.6	971	--	--	--	--	--	14 / 0.47	266 / 4.36	--	--	0.3 / 0.00	--	--	--	390	208	0	--
Effluent from Pond #4	1-13-65 / 1830	Grab	0.39	- / 7.9	868	48 / 2.40	9.7 / 0.80	94 / 4.09	8.6 / 0.22	1.6 / 0.09	0 / 0.00	216 / 3.54	21 / 0.44	133 / 3.75	14 / 0.23	1.0	--	--	426	160	0	54
Effluent from Pond #4	4-8-65 / 1100	Grab	0.36	- / 7.6	1190	68 / 3.39	9.1 / 0.75	136 / 5.92	26 / 0.66	--	0 / 0.00	271 / 4.44	15 / 0.31	216 / 6.09	0 / 0.00	1.0	--	--	706	207	0	59

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City or Orland																						
Ponds (plant abandoned)	7-21-60 / --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	29	--	--	--	--	--	1.9	--
Influent to ponds	5-27-63 / 1400	Grab	--	--	--	--	--	--	--	--	--	1.8	--	--	--	0.2	--	--	--	--	5.4	--
Influent to ponds	5-13-64 / 1700	Grab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13
Effluent from Pond #4	1-13-65 / 1830	Grab	0.39	--	--	--	--	--	--	--	--	1.2	--	--	--	1.6	--	--	--	--	16	16
Effluent from Pond #4	4-8-65 / 1100	Grab	0.36	--	--	--	--	--	--	--	--	1.9	--	--	--	--	--	0.0	--	5.6	--	--

CENTRAL VALLEY REGION NO. 5

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (ml/L)	Ether solubles (ppm)	Radioactivity: Alpha	Beta	Gross	Remarks
City of Orland										
Ponds (plant abandoned)	7-21-60 / --	Comp.	--	55	--	4.0	--	--	--	
Influent to ponds	5-27-63 / 1400	Grab	--	--	--	--	--	--	3.3±3.6	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Orland																				
Influent to ponds	5-27-63 / 1400	Grab	--	31	<0.57	<0.29	<1.4	<1.4	<1.4	21	8.6	<5.7	<0.29	<1.4	<0.29	1.9	<1.4	<0.57	4.9	<5.7

CITY OF RED BLUFF

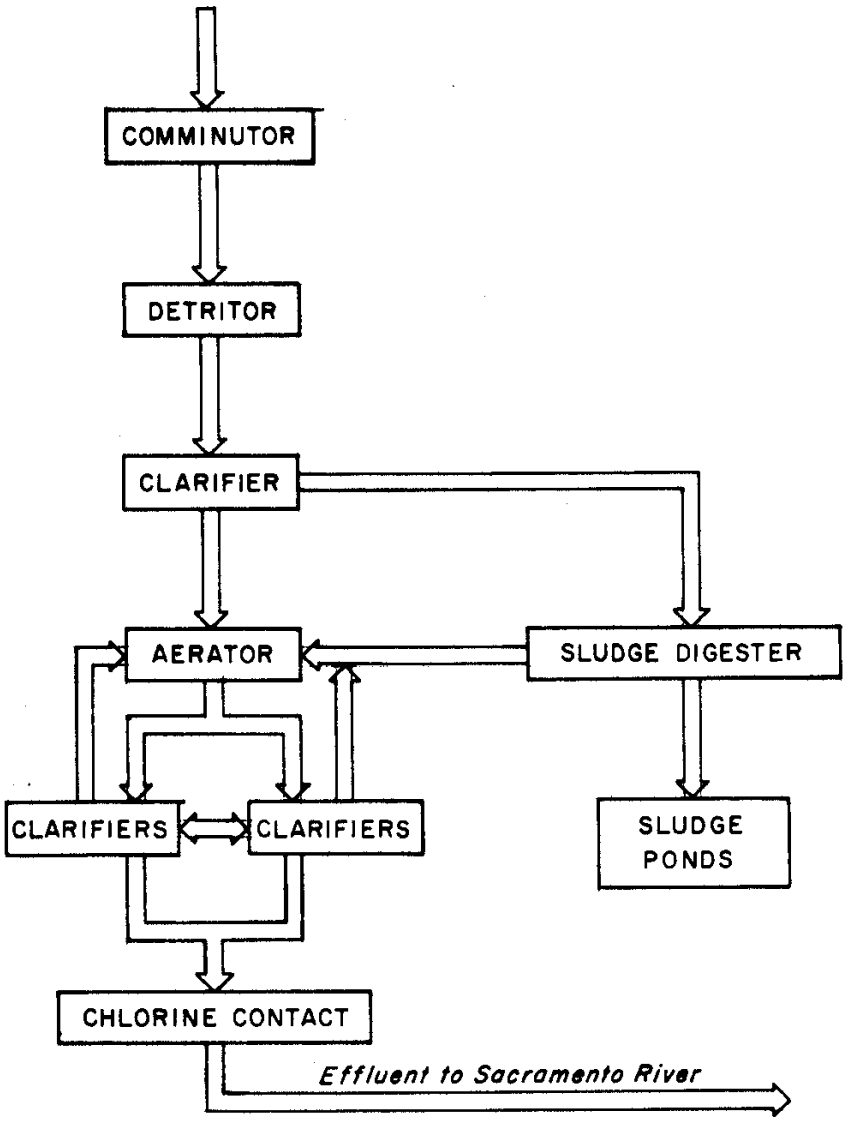
Red Bluff, the county seat of Tehama County, is a city of 8,000 persons in the upper Sacramento Valley. It is on the Sacramento River at the junction of State Highway 36 and Interstate 5. The sewage treatment plant is about 1.5 miles southeast of the town, between Interstate 5 and the Sacramento River, in the NE 1/4 of the SE 1/4 of Section 29, T27N, R3W, MDB&M.

Treatment of the waste water includes comminution, detrition, primary clarification, aeration, secondary clarification, and chlorination. For the year 1966, discharges from the waste water treatment facilities averaged 1.24 million gallons per day or 1,390 acre-feet per year. Effluent from the plant is discharged to the Sacramento River. As of March 1967, the city had indicated no intentions of utilizing reclaimed water for a planned beneficial use.

Analyses were made of the effluent from the Red Bluff plant at periodic intervals from June 1960 through November 1965. Based on these analyses, the quality of the effluent generally is considered to be Class 1 for irrigation purposes.

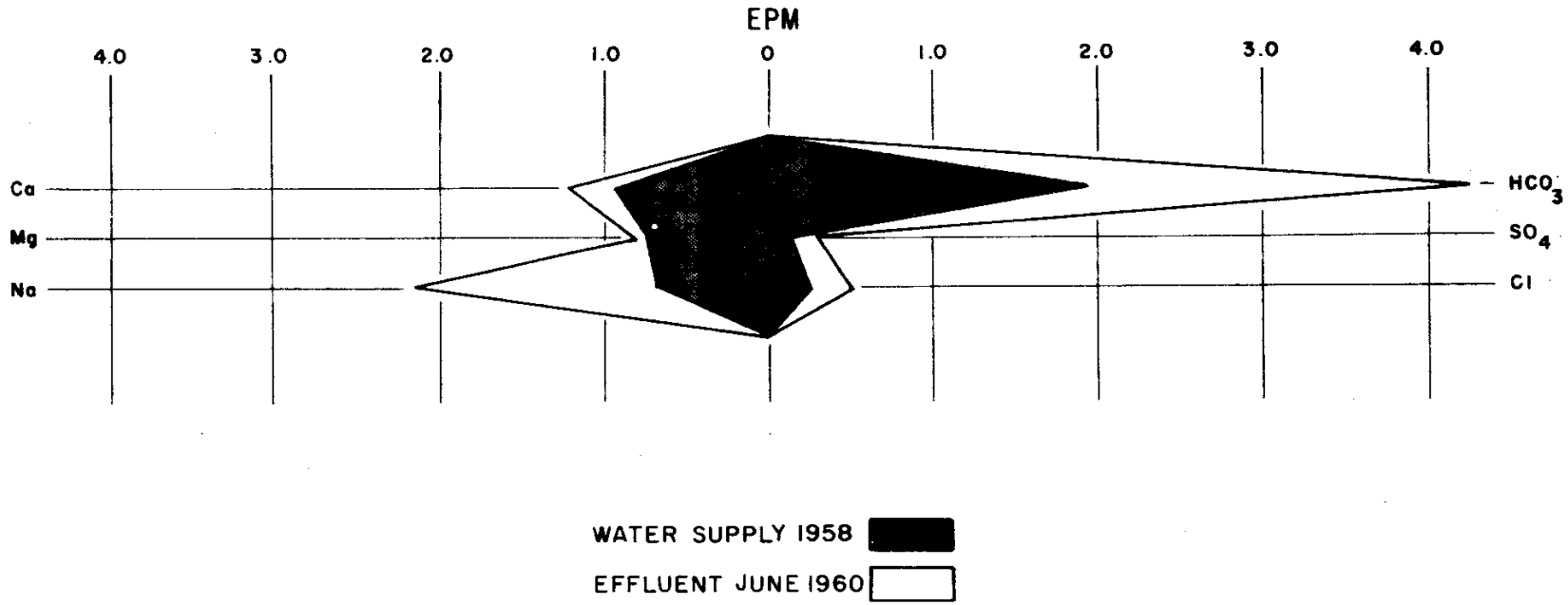
The graph on page 124 shows analyses of the supply water for the year 1958 and of the effluent for June 1960. These analyses indicate that the increments for the major chemical constituents are generally consistent with the increment values for all sewerage facilities considered in the study. The one exception is bicarbonate, which is nearly twice the median.

The mineral quality of the Red Bluff plant effluent is within the limits of the drinking water standards. If a market were to develop for the reclaimed water from the Red Bluff treatment plant, it is reasonable to suspect the quality of the water would be suitable for most beneficial uses.



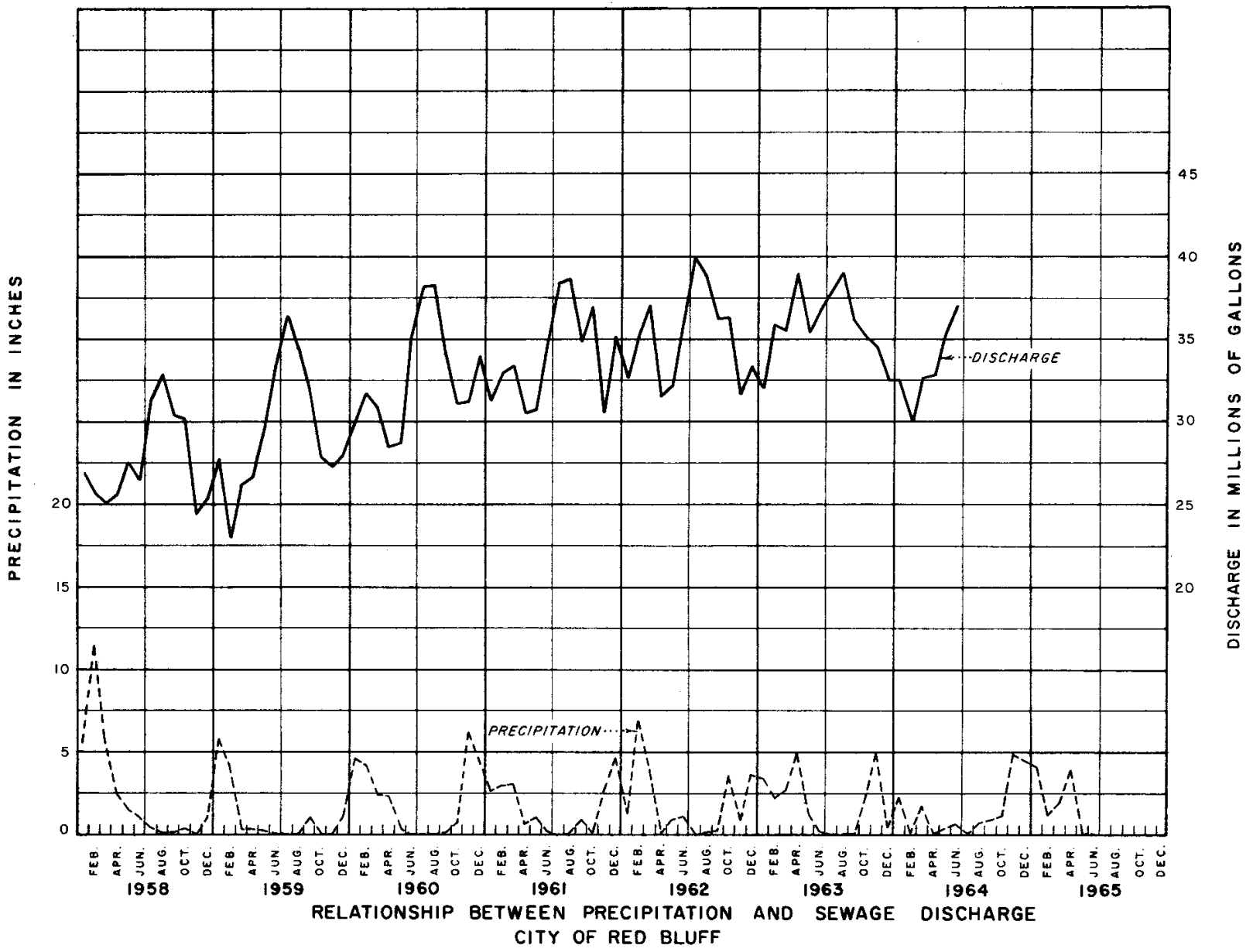
SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF RED BLUFF



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF RED BLUFF



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF RED BLUFF

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness N.C.	Percent Sodium
						Mineral constituents in milligrams per liter (ppm) / equivalents per million																
City of Red Bluff																						
Effluent from clarifier	6-20-56 / --	Comp.	0.89	- / 7.3	468	17 / 0.85	12 / 0.98	44 / 1.91	[illegible] / 0.22	[illegible] / 1.00	0 / 0.00	248 / 4.07	12 / 0.25	[illegible]	0.3 / 0.01	[illegible]	--	[illegible]	312[a]	[illegible]	[illegible]	[illegible]
Effluent from clarifier	7-10-57 / --	Comp.	0.97	- / 7.2	[illegible]61	17 / 0.85	13 / 1.07	42 / 1.83	[illegible].1 / 0.21	18 / 1.00	0 / 0.00	246 / 4.03	11 / 0.23	[illegible]	[illegible]	[illegible]	1.0 / [illegible]	[illegible]	31[illegible][a]	[illegible]	[illegible]	[illegible]
Final effluent	6-8-60 / --	Comp.	1.17	- / 7.7	526	24 / 1.20	9.7 / 0.80	49 / 2.13	7.[illegible] / 0.20	21 / 1.16	[illegible] / 0.00	2[illegible] / 4.20	[illegible] / 0.31	13 / [illegible]	[illegible]	[illegible].1	--	[illegible]	[illegible][a]	1[illegible]	[illegible]	[illegible]
Final effluent	11-14-60 / --	--	1.17	- / 7.2	749	15 / 0.75	16 / 1.33	[illegible] / 3.48	10 / 0.26	24 / 1.33	[illegible] / 0.00	268 / 4.39	20 / [illegible]	70 / 1.[illegible]	2.1 / [illegible]	[illegible]	--	[illegible]	[illegible][a]	1[illegible]	[illegible]	
Final effluent	12-12-60 / --	--	1.13	- / 7.3	785	--	--	94 / 4.09	10 / 0.26	--	--	--	--	[illegible]1 / 2.[illegible]	2.2 / [illegible]	[illegible].17	--	--	[illegible]	1[illegible]	-	[illegible]
Final effluent	1-16-61 / --	--	0.98	- / 7.1	846	--	--	99 / 4.31	12 / 0.31	2[illegible] / 1.71	--	--	--	[illegible] / 2.37	[illegible]	[illegible]	--	--	--	[illegible]	-	[illegible]
Final effluent	2-14-61 / --	--	1.29	- / 7.4	[illegible]31	--	--	99 / 4.31	9.2 / 0.24	1[illegible] / 1.0[illegible]	--	--	--	[illegible]1 / 2.[illegible]	1.3 / [illegible]	[illegible]	--	--	[illegible]	1[illegible]	-	[illegible]
Final effluent	3-20-61 / 1525	Grab	1.21	- / 7.7	[illegible]	23 / 1.15	1[illegible] / [illegible]	[illegible] / 3.2[illegible]	10 / 0.26	[illegible] / 1.[illegible]	[illegible]	[illegible]	21 / [illegible]	[illegible] / 1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]1[a]	1[illegible]	[illegible]	[illegible]
Final effluent	4-10-61 / --	--	1.00	- / 7.3	937	16 / 0.80	1[illegible] / 1.13	11[illegible] / [illegible]	11 / 0.28	3[illegible] / 2.00	0 / 0.0[illegible]	[illegible] / [illegible].33	2[illegible] / [illegible]	1[illegible] / 3.[illegible]	1.[illegible] / [illegible]	[illegible]	[illegible]	[illegible]	[illegible][a]	[illegible]	[illegible]	[illegible]
Final effluent	5-23-61 / --	--	0.99	7.3	1000	--	--	142 / [illegible].1[illegible]	10 / [illegible].2[illegible]	--	--	--	--	1[illegible] / [illegible]	--	[illegible]	--	--	[illegible]	[illegible]	-	[illegible]
Final effluent	6-12-61 / --	--	0.9[illegible]	- / 7.6	71[illegible]	[illegible]	12 / 1.01	7[illegible] / 3.2[illegible]	[illegible] / 0.23	[illegible] / 1.[illegible]	[illegible]	2.[illegible] / [illegible]	1[illegible] / [illegible]	[illegible] / 1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Discharge from clarifier	8-9-62 / --	Comp.	--	- / 7.2	314	21 / 1.05	1[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / 0.2[illegible]	21 / 1.[illegible]	0 / 0.0[illegible]	[illegible] / [illegible].72	1[illegible] / 0.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible][a]			
Discharge from clarifier	1-30-64 / 1130	Grab	1.[illegible]	3.2 / 7.1	70[illegible]	28 / 1.40	[illegible] / 0.44	67 / 2.91	13 / 0.33	3[illegible] / 2.11	0 / 0.00	302 / 4.97	[illegible] / 0.21	[illegible] / 1.1[illegible]	1.[illegible] / 0.03	[illegible]	[illegible]	[illegible]	3[illegible]	[illegible]	[illegible]	[illegible]
Discharge from holding pond	11-17-65 / 1100	Grab	1.[illegible]	- / [illegible].1	393	25 / 1.25	10 / 0.[illegible]	38 / 1.[illegible]	[illegible] / 0.1	--	0 / 0.00	1[illegible] / [illegible]	1[illegible] / 0.40	17 / [illegible]	2[illegible] / [illegible]	[illegible].1	--	--	[illegible]1	1[illegible]	[illegible]	[illegible]

(a) Sum of analysed constituents

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Red Bluff																						
Effluent from clarifier	6-20-56 --	Comp.	0.89	--	--	--	--	--	--	--	--	--	--	--	49	--	--	--	--	--	15	--
Effluent from clarifier	7-10-57 --	Comp.	--	--	--	--	--	--	--	--	--	--	22	--	96	--	--	--	--	--	5.0	--
Final effluent	6-8-60 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--
Final effluent	11-14-60 --	--	1.2	--	--	--	--	--	--	--	--	6.5	--	--	102	--	0.03	--	21	--	27	--
Final effluent	3-20-61 1625	Grab	--	--	--	--	--	--	--	--	--	7.5	--	--	134	--	1.01	2.7	11	--	35	34
Final effluent	4-18-61 --	--	--	--	--	--	--	--	--	--	--	--	--	--	179	--	--	--	--	--	36	--
Final effluent	6-12-61 --	--	--	--	--	--	--	--	--	--	--	--	--	--	148	--	--	--	--	--	32	--
Discharge from clarifier	8-8-62 --	Comp.	--	--	--	--	--	--	--	--	--	3.4	--	--	--	21	--	0.7	--	--	22	--
Discharge from clarifier	1-30-64 1130	Grab	1.0	--	--	--	--	--	--	--	--	4.0	--	--	--	--	--	--	--	--	27	--
Final effluent (new plant)	11-17-65 1100	Grab	1.5	--	--	--	--	--	--	--	--	0.3	--	--	--	--	--	--	--	1.0	11	11

ANALYSES OF WASTE WATER
PART 3

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Red Bluff										
Effluent from clarifier	6-20-56 --	Comp.	0.89	50	--	--	--	--	--	
Effluent from clarifier	7-10-57 --	Comp.	--	93	--	--	--	--	--	
Final effluent	11-14-60 --	--	1.2	--	1.4	49	--	--	--	
Final effluent	3-20-61 1625	Grab	--	88	0.8	43	--	--	--	
Final effluent	4-18-61 --	--	--	104	0.7	46	--	--	--	
Final effluent	6-12-61 --	--	--	124	1.3	52	--	--	--	
Discharge from clarifier	8-8-62 --	Comp.	--	--	--	--	--	--	16.1±3.7	
Discharge from clarifier	1-30-64 1130	Grab	1.0	--	--	--	--	--	9.8±4.3	

CITY OF REDDING

Redding, the county seat of Shasta County, is a city of about 16,000 persons. The city is just west of the Sacramento River and Interstate Highway 5 near the head of the Valley. The primary sewage treatment plant is on the east side of the town, west of the river and south of Cypress Avenue, in the SE 1/4 of the NE 1/4 of Section 1, T31N, R5W, MDB&M. A new secondary treatment plant located about five miles south of the center of Redding was integrated with the system March 27, 1967. The primary plant will continue to treat the waste water up to the flow equivalent of a population of 20,000.

Treatment of the waste water includes barminution, detrition, aeration, clarification, and chlorination at the primary plant and secondary treatment in oxidation ponds at the new unit. For the period July 1956 through June 1965, discharges from the waste water treatment facilities averaged 2.50 million gallons per day or 2,800 acre-feet per year.

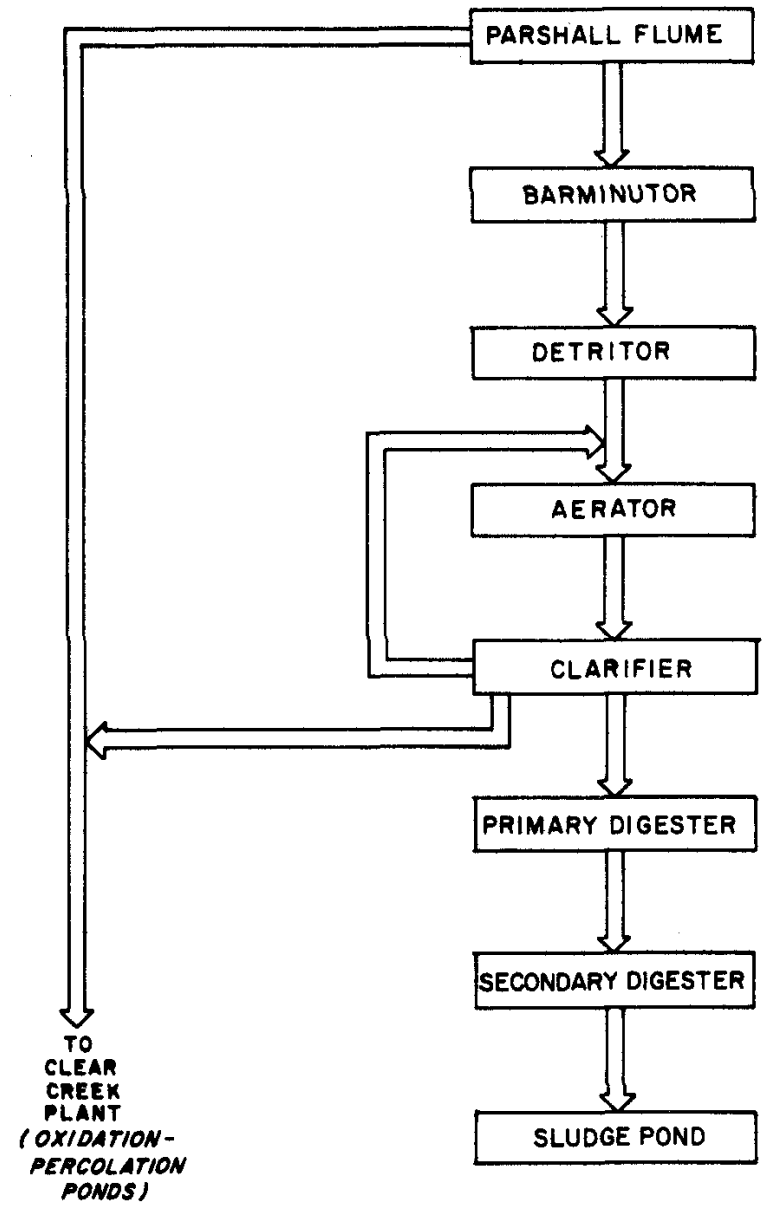
As of April 1967, it was expected that all water from the system would be dissipated from the new oxidation ponds by evaporation and percolation to ground water. It is possible that some effluent from the oxidation ponds may be discharged to the Sacramento River, but only in accordance with Water Quality Control Board requirements.

At periodic intervals from June 1956 through November 1965, analyses were made of the effluent from the Redding waste water treatment plant. Based on these analyses, the quality of the effluent during that period was Class 1 for irrigation purposes.

The graph on page 132 compares analyses of the supply water for the year 1961 and of the effluent for April 1961. These analyses indicate that the increases in the major chemical constituents are consistent with the

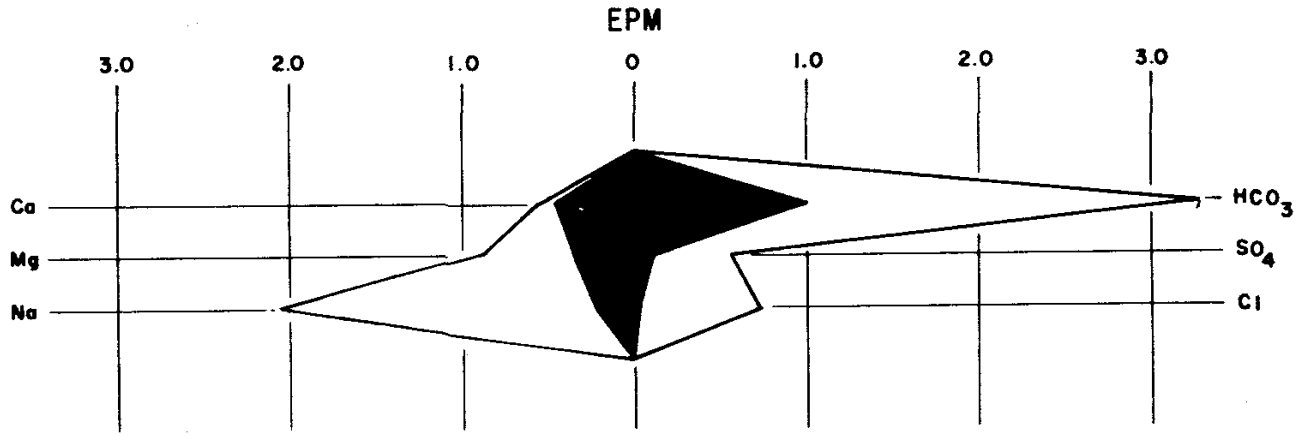
relatively low increment values noted at most sewerage facilities considered in the District.

If a market is developed for the use of reclaimed water from this plant, the mineral quality of the treated waste water would appear to be satisfactory for most beneficial uses.



SCHEMATIC OF WASTE WATER TREATMENT FACILITIES

CITY OF REDDING

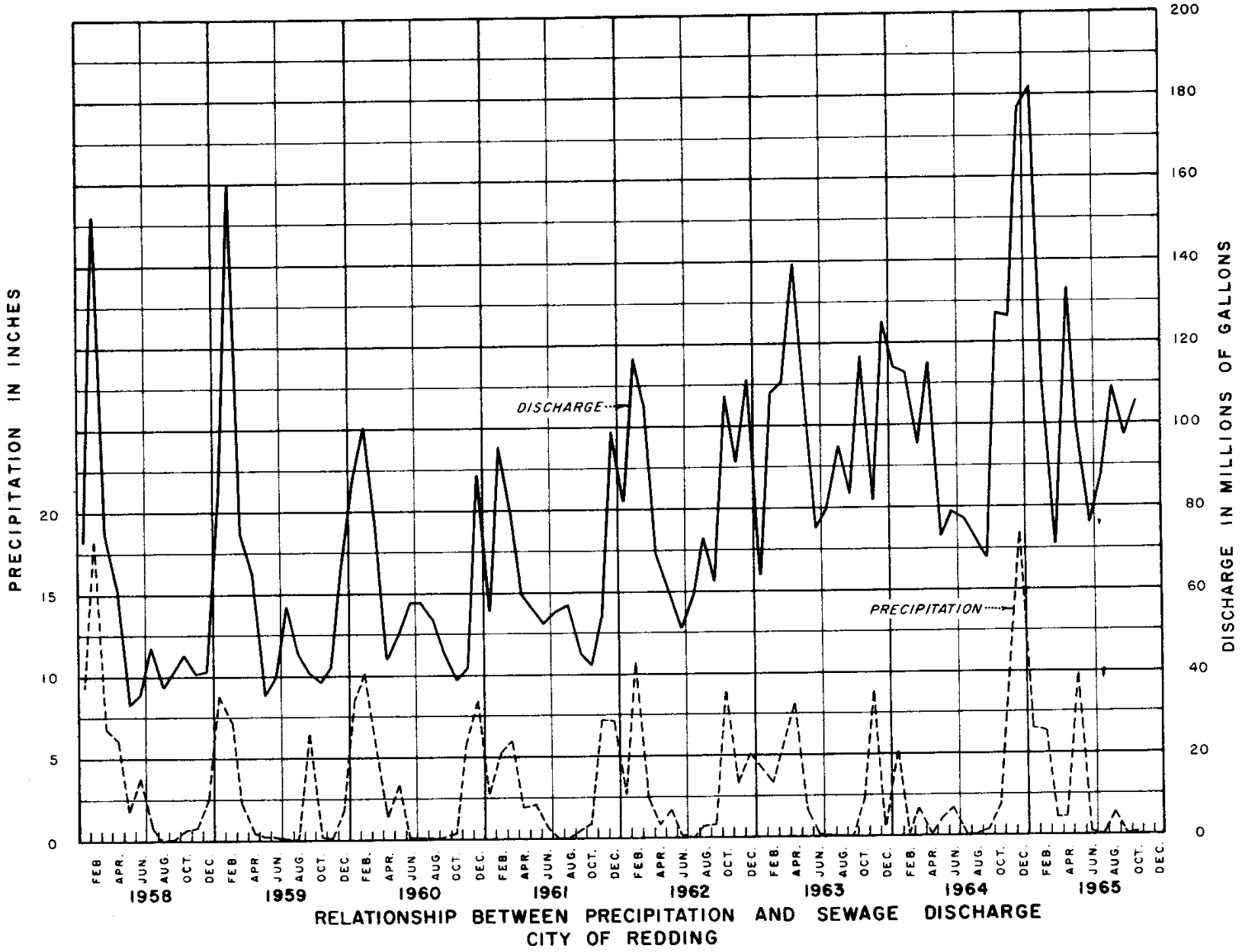


WATER SUPPLY 1961

EFFLUENT APRIL 1961

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF REDDING



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF REDDING

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness N.C.	Percent Sodium
						Mineral constituents: milligrams per liter (ppm) / equivalents per million																
City of Redding																						
Discharge from clarifier	6-20-56 / 24 hr	Comp.	3.6	- / 7.2	441	11 / 0.55	7.8 / 0.64	37 / 1.61	7.3 / 0.19	22 / 1.23	0 / 0.00	[illegible] / [illegible]	23 / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	0.37	--	[illegible]	[illegible] a	[illegible]	[illegible]	[illegible]
Discharge from clarifier	7-10-57 / 24 hr	Comp.	1.89	- / 6.5	375	11 / 0.55	8.9 / 0.73	32 / 1.39	7.2 / 0.18	19 / 1.05	0 / 0.00	[illegible] / [illegible]	[illegible] / [illegible]	21 / [illegible]	[illegible] / [illegible]	[illegible]	[illegible]	[illegible]	[illegible] a	[illegible]	[illegible]	3
Final effluent	6-8-60 / 24 hr	Comp.	--	- / 7.3	444	15 / 0.75	[illegible] / [illegible]	36 / [illegible]	[illegible] / 0.19	20 / 1.11	0 / [illegible]	151 / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	11 / [illegible]	[illegible]	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Final effluent	11-14-60 / --	Comp.	1.49	- / 7.0	524	11 / 0.55	12 / 0.99	42 / 1.83	10 / 0.26	27 / 1.50	0 / 0.00	213 / 3.49	[illegible] / 0.12	31 / [illegible]	[illegible] / [illegible]	[illegible]	--	[illegible]	[illegible]	[illegible]	[illegible]	3
Final effluent	1-16-61 / 12 hr	Comp.	--	- / 6.9	544	--	--	46 / 2.00	10 / 0.26	26 / 1.44	--	--	--	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Final effluent	1-20-61 / 1730	--	--	- / 6.9	405	--	--	35 / 1.52	[illegible] / [illegible]	--	--	--	--	[illegible] / [illegible]	--	[illegible]	--	--	--	[illegible]	-	[illegible]
Final effluent	2-14-61 / 12 hr	Comp.	4.2	- / 7.3	374	16 / [illegible]	9.7 / 0.80	33 / [illegible]	4.4 / 0.11	[illegible] / 0.27	0 / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	--	[illegible]	[illegible]	[illegible]		[illegible]
Final effluent	3-20-61 / 12 hr	Grab	2.74	- / 7.3	409	--	--	[illegible] / [illegible]	[illegible] / 0.19	10 / [illegible]	--	--	--	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Final effluent	4-18-61 / --	--	--	6.8 / 7.4	508	11 / [illegible]	10 / [illegible]	47 / 2.04	[illegible] / 0.24	24 / 1.33	0 / 0.00	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	[illegible] / [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Final effluent	5-23-61 / 1700	Grab	1.73	[illegible] / -	480	--	--	61 / 2.65	[illegible] / 0.20	--	--	--	--	[illegible] / [illegible]	-	[illegible]	[illegible]	--	[illegible]	[illegible]	[illegible]	
Final effluent	6-12-61 / 12 hr	Comp.	--	6.6 / 7.2	511	17 / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	24 / 1.33	[illegible] / [illegible]	[illegible] / 3.1	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	[illegible] / [illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Discharge from holding tank	8-8-62 / --	Comp.	1.6	- / 6.9	456	14 / [illegible]	9.0 / 0.74	[illegible] / 1.57	[illegible] / [illegible]	[illegible] / 1.27	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	[illegible] / [illegible]	[illegible]	[illegible] a	[illegible]	[illegible]	[illegible]
Discharge into holding tank	1-22-64 / 1530	Grab	9.45	7.5 / 7.2	432	13 / 0.65	10 / [illegible]	44 / 1.91	[illegible] / [illegible]	12 / [illegible]	0 / 0.00	[illegible] / [illegible]	[illegible] / [illegible]	21 / [illegible]	[illegible] / [illegible]	[illegible]	[illegible] / [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Discharge from holding tank	2-18-65 / 1630	Grab	3.8	- / 7.0	622	25 / 1.25	11 / 0.91	[illegible] / 3.00	[illegible] / [illegible]	--	0 / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	--	--	[illegible] a	[illegible]	[illegible]	--
Discharge from holding tank	11-17-65 / 0940	Grab	5.5	6.8 / 7.8	381	18 / 0.90	8.0 / 0.66	27 / 1.17	4.6 / 0.12	--	0 / 0.00	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible] / [illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Redding																						
Discharge from clarifier	6-20-56 --	Comp.	3.6	--	--	--	--	--	--	--	--	--	--	--	87	--	--	--	--	--	16	--
Discharge from clarifier	7-10-57 --	Comp.	1.9	--	--	--	--	--	--	--	--	--	22	--	102	--	--	--	--	--	5.6	--
Final effluent	6-8-60 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	--
Final effluent	11-14-60 --	Comp.	--	--	--	--	--	--	--	--	--	5.6	--	--	150	--	--	--	--	--	23	29
Influent	1-16-61 --	Comp.	--	--	--	--	--	--	--	--	--	8.0	--	--	227	--	--	2.2	14	--	31	34
Final effluent	2-14-61 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	63	--	--	--	--	--	11	--
Final effluent	4-18-61 --	--	--	--	--	--	--	--	--	--	--	--	--	--	323	--	--	--	--	--	32	--
Final effluent	6-12-61 --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	175	--	--	--	--	--	29	--
Discharge from holding tank	8-8-62 --	Comp.	1.8	--	--	--	--	--	--	--	--	2.5	--	--	--	--	--	--	--	--	20	--
Discharge into holding tank	1-22-64 1530	Grab	9.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.38	--
Discharge from holding tank	2-18-65 1630	Grab	3.8	--	--	--	--	--	--	--	--	6.8	--	--	--	--	--	0.6	--	--	--	31
Discharge from holding tank	11-17-65 0940	Grab	5.5	--	--	--	--	--	--	--	--	0.6	--	--	--	--	--	--	--	13	6.8	7.8

ANALYSES OF WASTE WATER
PART 3

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Redding										
Final effluent	11-14-60 / --	Comp.	--	--	3.0	44	--	--	--	
Final effluent	2-14-61 / --	Comp.	--	44	1.0	18	--	--	--	
Final effluent	4-18-61 / --	--	--	84	0.2	36	--	--	--	
Final effluent	6-12-61 / --	Comp.	--	116	0.6	47	--	--	--	
Discharge from holding tank	8-8-62 / --	Comp.	1.8	--	--	--	--	--	46.7±4.3	
Discharge into holding tank	1-22-64 / 1530	Grab	9.4	--	--	--	--	--	13.9±4.6	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Redding																				
Discharge from holding tank	8-8-62 --	Comp.	1.8	16	<1.3	<0.67	<3.3	<3.3	<3.3	<3.3	253	<13	<0.67	2..	0.67	1[illegible]	<3.3	<1.3	2.1	<13
Discharge into holding tank	1-22-64 1530	Grab	9.4	11	<0.57	<0.29	<1.4	<1.4	--	<1.4	57	<5.7	<0.29	4.6	<0.29	4.9	11	<0.57	1.0	<5.7

COMMUNITY OF SCOTIA

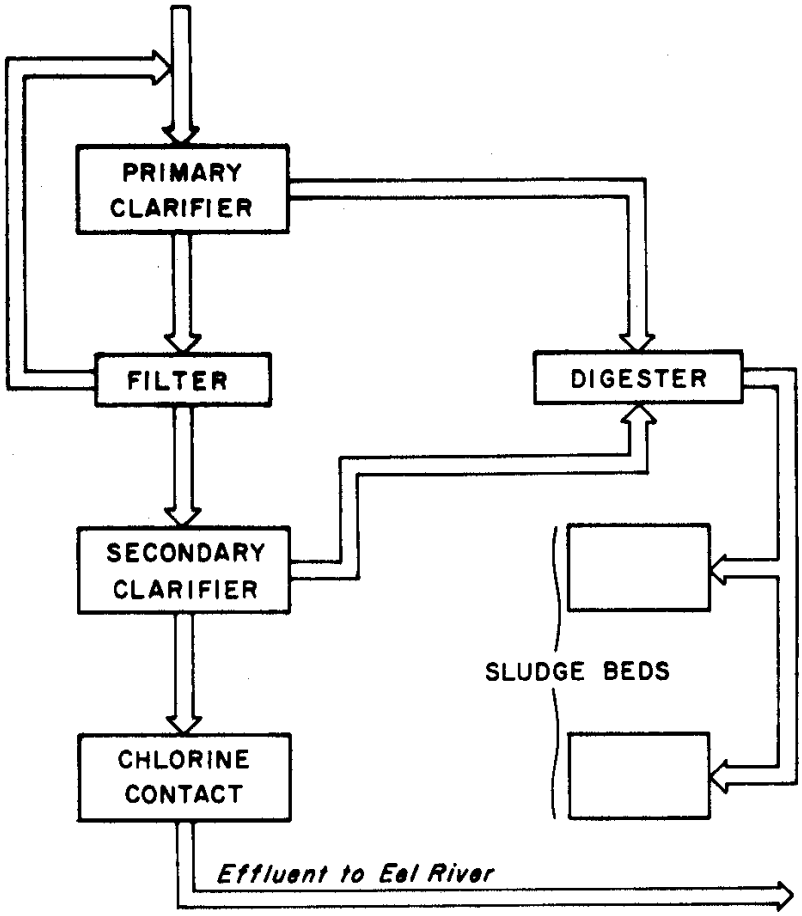
Scotia is an unincorporated community of 1,200 persons on the Eel River in Humboldt County. It is on U. S. Highway 101 about 25 miles south of Eureka. Sewerage facilities are provided to the community by the Pacific Lumber Company. The sewage treatment plant is on the west side of town on the east bank of the Eel River in the NW 1/4 of the SE 1/4 of Section 7, T1N, R1E, HB&M.

Treatment of the waste water includes primary clarification, filtration, secondary clarification, and chlorination. For the period September 1965 through January 1967 the average flow from the Scotia Plant was 0.32 million gallons per day or 360 acre-feet per year. Effluent from the treatment plant is discharged to the Eel River.

A representative sample of the effluent from the Scotia waste water treatment plant was collected in February 1964. Based on the analysis of this sample the quality of the effluent is considered Class 1 for irrigation purposes.

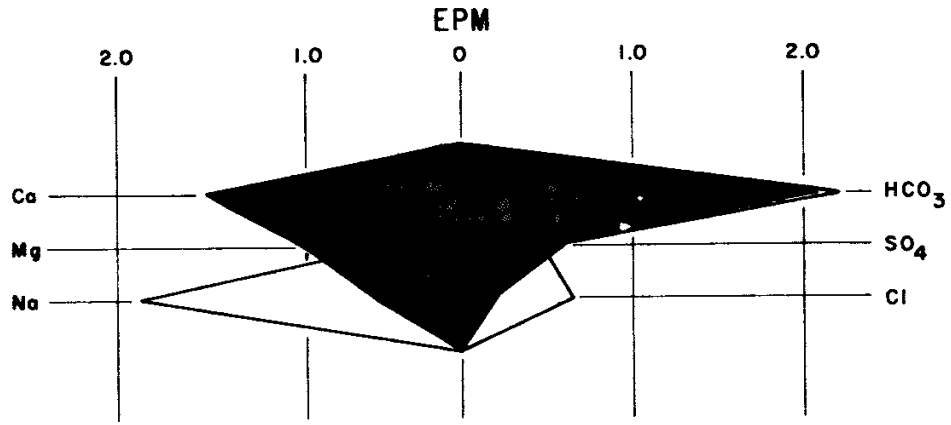
The graph on page 140 compares analyses of supply water for the year 1951 and of the effluent for February 1964. These analyses indicate that the increments for the major chemical constituents are all quite low or negative.

If present trends of water quality prevail, there is reason to believe that this effluent could be beneficially used.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

TOWN OF SCOTIA



WATER SUPPLY 1951

EFFLUENT FEB. 1964

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

TOWN OF SCOTIA

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
Scotia (Pacific Lumber Company)																						
Final effluent S.T.P.	2-6-64 / 1515	Grab	0.50	7.6 / 7.2	399	16 / 0.80	5.8 / 0.48	43 / 1.87	5.2 / 0.13	18 / 0.82	0 / 0.00	134 / 2.20	23 / 0.48	23 / 0.65	0.4 / 0.01	0.4	0.7 / 0.04	22	220	64	3	57
Boiler and cooling water pond	6-21-61 / 0900	Grab	2.2	- / 7.5	309	22 / 1.10	5.6 / 0.46	37 / 1.61	3.9 / 0.10	0.6 / 0.03	0 / 0.00	128 / 2.11	32 / 0.67	8.2 / 0.23	1.3 / 0.02	0.2	0.2 / 0.01	14	1.1[a]	70	0	49
Mill pond effluent	2-6-64 / 1430	Grab	--	7.1 / 7.0	149	14 / 0.70	4.6 / 0.38	2.0 / 0.09	2.8 / 0.07	0.6 / 0.03	0 / 0.00	78 / 1.28	1.8 / 0.04	12 / 0.37	0.2 / 0.01	0.1	0.1 / 0.01	11	93	44	10	13
Barker pond	6-21-61 / 0900	Grab	--	- / 6.5	140	8.2 / 0.41	5.7 / 0.47	8.2 / 0.36	6.9 / 0.18	1.4 / 0.08	0 / 0.00	72 / 1.18	0.0 / 0.00	14 / 0.39	0.2 / 0.00	0.2	0.2 / 0.01	14	74	38	1	21
Barker pond	2-6-64 / 1400	Grab	--	6.2 / 5.8	127	3.5 / 0.17	4.2 / 0.35	10 / 0.44	7.4 / 0.19	2.6 / 0.08	0 / 0.00	14 / 0.23	0.5 / 0.01	14 / 0.39	0.1 / 0.00	1.2	0.2 / 0.01	18	74	32	1	37

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Scotia (Pacific Lumber Company)																						
Barker Pond	6-21-61 0900	Grab	--	1.2	0.01	0.00	0.01	0.00	0.00	0.05	0.98	--	--	--	110	--	--	--	--	--	1.1	--
Boiler and cooling water pond	6-21-61 0900	Grab	2.2	0.22	0.00	0.00	0.00	0.01	0.04	0.03	0.14	--	--	--	2.2	--	--	--	--	--	3.3	--
Barker pond	2-6-64 1400	Grab	--	--	--	--	--	--	--	--	--	0.2	--	--	--	--	--	--	--	--	1.6	--
Log pond effluent	2-6-64 1430	Grab	--	--	--	--	--	--	--	--	--	0.0	--	--	--	--	--	--	--	--	0.23	--
Final effluent S.T.P.	2-6-64 1515	Grab	0.50	--	--	--	--	--	--	--	--	3.1	--	--	--	--	--	--	--	--	10	--

ANALYSES OF WASTE WATER
PART 3

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Scotia (Pacific Lumber Company)										
Barker pond	6-21-61 / 0900	Grab	--	192	--	21	--	--	3.5±4.2	
Boiler and cooling water pond	6-21-61 / 0900	Grab	2.2	18	--	3.6	--	--	0.0±4.1	
Log pond effluent	2-6-64 / 1430	Grab	--	--	--	--	--	--	9.9±4.7	
Final effluent S.T.P.	2-6-64 / 1515	Grab	0.50	--	--	--	--	--	11.4±4.7	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Scotia (Pacific Lumber Company)																				
Log pond effluent	2-6-64 / 1430	Grab	--	29	<0.57	<0.29	<1.4	<1.4	<1.4	9.1	39	<5.7	<0.29	5.4	<0.29	3.9	<1.4	2.5	<0.29	<5.7
Final effluent S.T.P.	2-6-64 / 1515	Grab	0.50	14	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	134	<5.7	<0.29	90	<0.29	6.7	<1.4	<0.57	<0.29	<5.7

SUSANVILLE CONSOLIDATED SANITARY DISTRICT

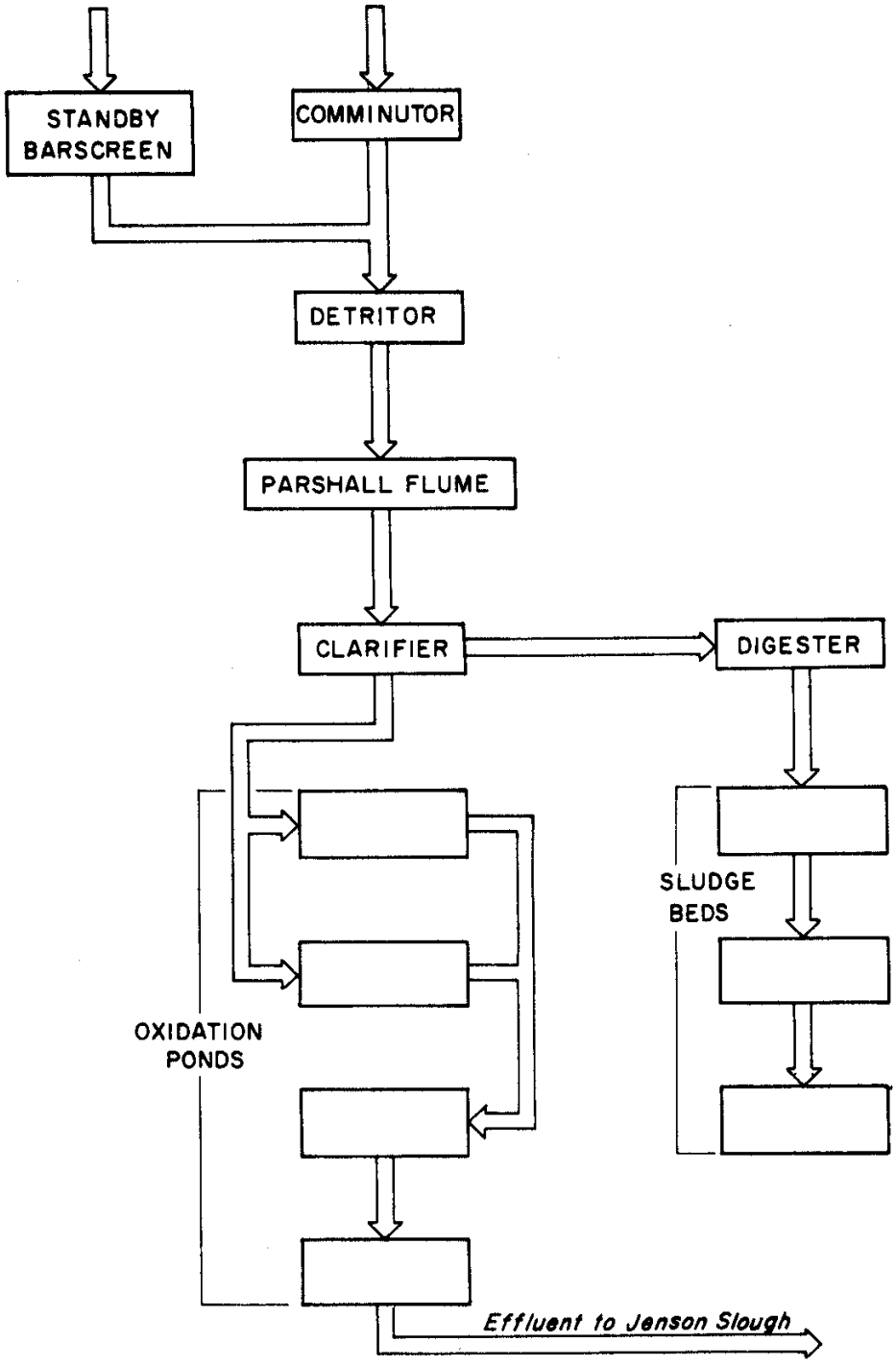
Susanville, county seat of Lassen County, is a city of 7,000 persons. The sewerage system, however, is provided by the sanitary district rather than the city. The sewage treatment plant is north of State Highway 36, east of the fairground, off Russel Drive, in the NE 1/4 of the NW 1/4 of Section 33, T30N, R12E, MDB&M.

Treatment of the waste water includes comminution, detrition, clarification and oxidation by ponding. For the period July 1955 through June 1965 discharges from the waste water treatment facilities averaged 0.44 million gallons per day or 495 acre-feet per year. Effluent from the plant is discharged to Jenson Slough. During extended periods of precipitation, waters from this slough discharge to the Susan River. In drier seasons the slough waters, including water from the Susanville waste water treatment plant, are used for irrigation.

At periodic intervals from May 1959 through November 1965 analyses have been made of effluent from the Susanville plant. Based on these analyses, the quality of the effluent is generally Class 1 for irrigation purposes. On two occasions the boron concentration exceeded 0.5 parts per million.

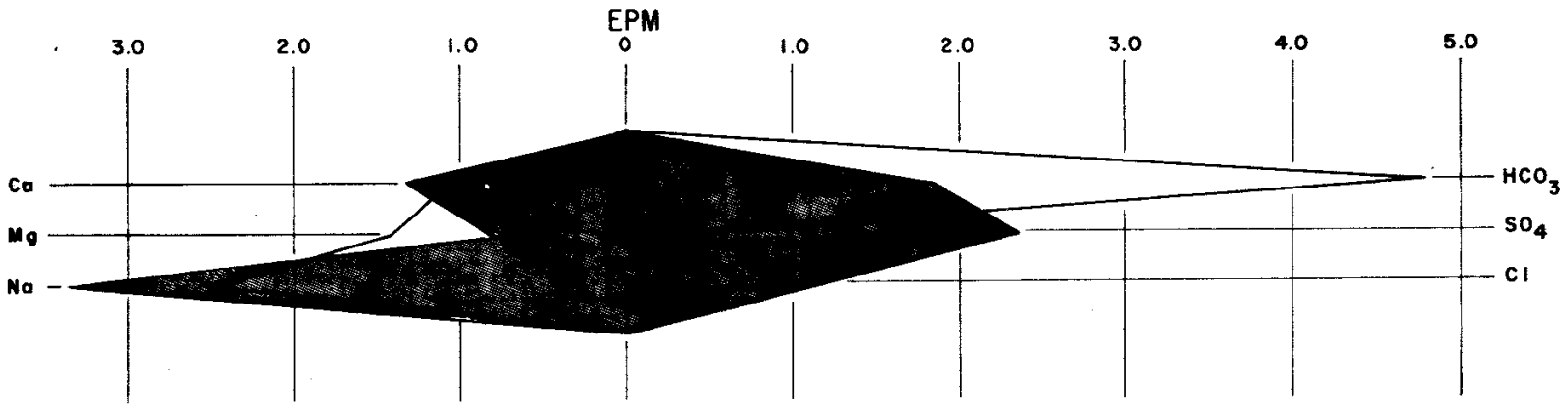
The graph on page 148 compares analyses of supply water for the year 1961 and of the effluent for April 1961. These analyses indicate that the increments of the major chemical constituents have a somewhat erratic pattern. Calcium, sulfate, and chloride show lesser increment values than the median for all sewerage facilities considered; in fact, they show decrements. On the other hand, sodium, bicorbonate and nitrate show greater increments than the norm. Although this incongruity exists, it is not sufficient to impair the quality of the water for benefical use to be made of it.

The mineral quality of the effluent is within the recommended limits of the drinking water standards. Assuming existing conditions prevail, there is reason to expect the water discharged from the waste water treatment plant at Susanville will be satisfactory for irrigation purposes.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

SUSANVILLE CONSOLIDATED SANITARY DISTRICT

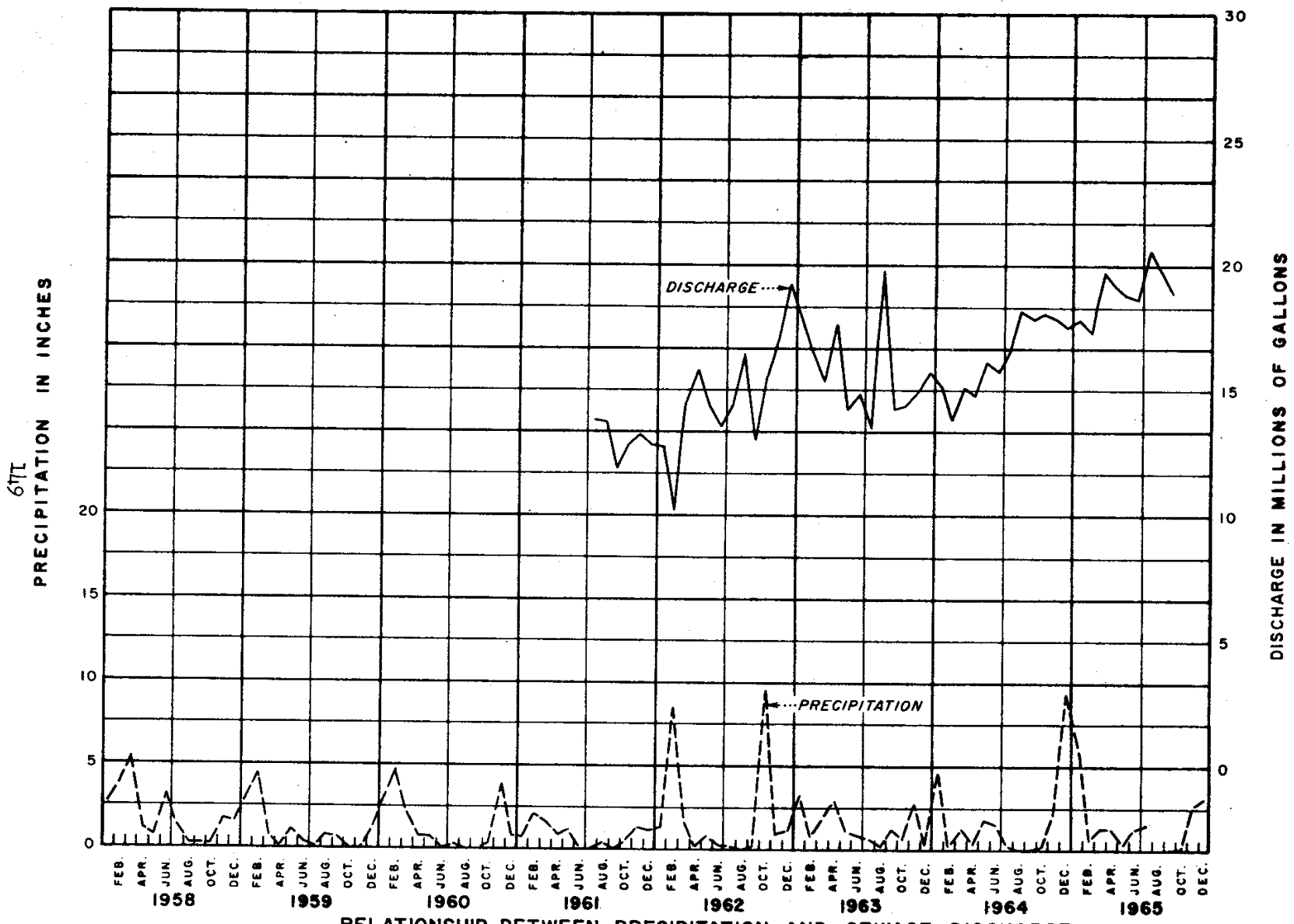


WATER SUPPLY 1961

EFFLUENT APRIL 1961

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

SUSANVILLE CONSOLIDATED SANITARY DISTRICT



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
SUSANVILLE CONSOLIDATED SANITARY DISTRICT

ANALYSES OF WASTE WATER
PART I

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents (milligrams per liter (ppm) / equivalents per million): Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ (ppm): N.C.	Percent Sodium
Susanville Consolidated Sanitary District																						
Effluent from final pond	5-4-59 / --	Comp.	0.55	- / 9.1	508	22 / 1.10	14 / 1.14	60 / 2.61	14.5 / 0.37	6.8 / 0.38	18 / 0.60	199 / 3.26	17 / 0.35	34 / 0.96	40 / 0.64	0.23	0.9 / 0.05	--	325[a]	117	0	47
Effluent from final pond	4-27-61 / 0900	Grab	0.52	- / 7.7	635	21 / 1.05	17 / 1.41	57 / 2.48	14 / 0.36	21 / 1.16	0 / 0.00	293 / 4.80	15 / 0.31	25 / 0.70	15 / 0.24	0.4	0.4 / 0.02	48	433	153	0	38
Effluent from final pond	8-9-62 / 0845	Grab	0.54	8.4 / 7.2	747	14 / 0.70	17 / 1.40	91 / 3.96	19 / 0.49	15 / 1.05	0 / 0.00	291 / 4.77	29 / 0.60	54 / 1.52	1.1 / 0.02	0.6	0.7 / 0.04	63	450[a]	105	0	59
Effluent from clarifier	6-6-63 / 0730	Grab	0.52	- / 7.4	538	26 / 1.30	11 / 0.92	32 / 1.39	9.0 / 0.23	20 / 1.43	0 / 0.00	268 / 4.39	11 / 0.23	17 / 0.48	0.0 / 0.00	0.1	0.1 / 0.00	35	295[a]	111	0	26
Effluent from final pond	7-1-64 / 0900	Grab	0.48	8.4 / 9.0	481	8.3 / 0.41	12 / 1.03	74 / 3.22	14 / 0.36	--	30 / 1.00	138 / 2.26	18 / 0.37	40 / 1.13	1.6 / 0.03	0.8	--	--	367	72	0	61
Effluent from final pond	2-4-65 / 1130	Grab	0.69	- / 7.3	495	--	--	--	--	--	0 / 0.00	216 / 3.54	--	19 / 0.54	0.0 / 0.00	--	--	--	253	92	0	--
Effluent from clarifier	11-16-65 / 1440	Grab	0.7	--	733	--	--	--	--	--	--	--	--	28 / 0.79	--	--	--	--	--	90	--	--
Effluent from final pond	11-16-65 / 1430	Grab	0.7	- / 7.8	674	29 / 1.45	10 / 0.85	59 / 2.57	14 / 0.36	--	0 / 0.00	283 / 4.64	31 / 0.64	34 / 0.96	2.4 / 0.04	0.5	--	--	392[a]	115	0	49

(a) Sum of analyzed constituents.

LAHONTAN REGION NO. 6

ANALYSES OF WASTE WATER
PART 2

Source	Date Time Sampled (PST)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Susanville Consolidated Sanitary District																						
Effluent from final pond	5-4-59 --	Comp.	0.53	--	--	--	--	--	--	--	--	--	--	--	24	--	--	--	--	--	24	25
Effluent from final pond	4-27-61 0900	Grab	0.52	--	--	--	--	--	--	--	--	--	--	--	113	--	--	--	--	--	33	--
Effluent from final pond	8-9-62 0845	Grab	0.54	--	--	--	--	--	--	--	--	3.9	--	--	--	15	--	--	--	--	32	--
Effluent from clarifier	6-6-63 0730	Grab	0.52	--	--	--	--	--	--	--	--	3.4	--	--	--	20	--	--	--	--	18	--
Effluent from final pond	7-1-64 0900	Grab	0.48	--	--	--	--	--	--	--	--	--	--	--	--	3.0	--	--	--	--	20	--
Effluent from final pond	2-4-65 1130	Grab	0.69	--	--	--	--	--	--	--	--	4.2	--	--	--	--	--	--	--	--	--	20
Effluent from clarifier	11-16-65 1440	Grab	0.7	--	--	--	--	--	--	--	--	8.6	--	--	--	--	--	--	--	--	--	--
Effluent from final pond	11-16-65 1430	Grab	0.7	--	--	--	--	--	--	--	--	2.0	--	--	--	--	--	--	--	26	41	43

ANALYSES OF WASTE WATER
PART 3

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Other solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Susanville Consolidated Sanitary District										
Effluent from final pond	5-4-59 / --	Comp.	0.53	46	--	9.0	0.15±0.26	0.0±4.4	--	
Effluent from final pond	4-27-61 / 0900	Grab	0.52	44	--	20	--	--	0.6±3.6	
Effluent from final pond	8-9-62 / 0845	Grab	0.54	--	--	--	--	--	25.8±3.9	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

LAHONTAN REGION NO. 6

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Susanville Consolidated Sanitary District																				
Effluent from clarifier	6-6-63 / 0730	Grab	0.52	29	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	74	<5.7	<0.29	123	<0.29	3.7	<1.4	<0.57	8.4	<5.7

WEED, SHASTINA SANITARY DISTRICT

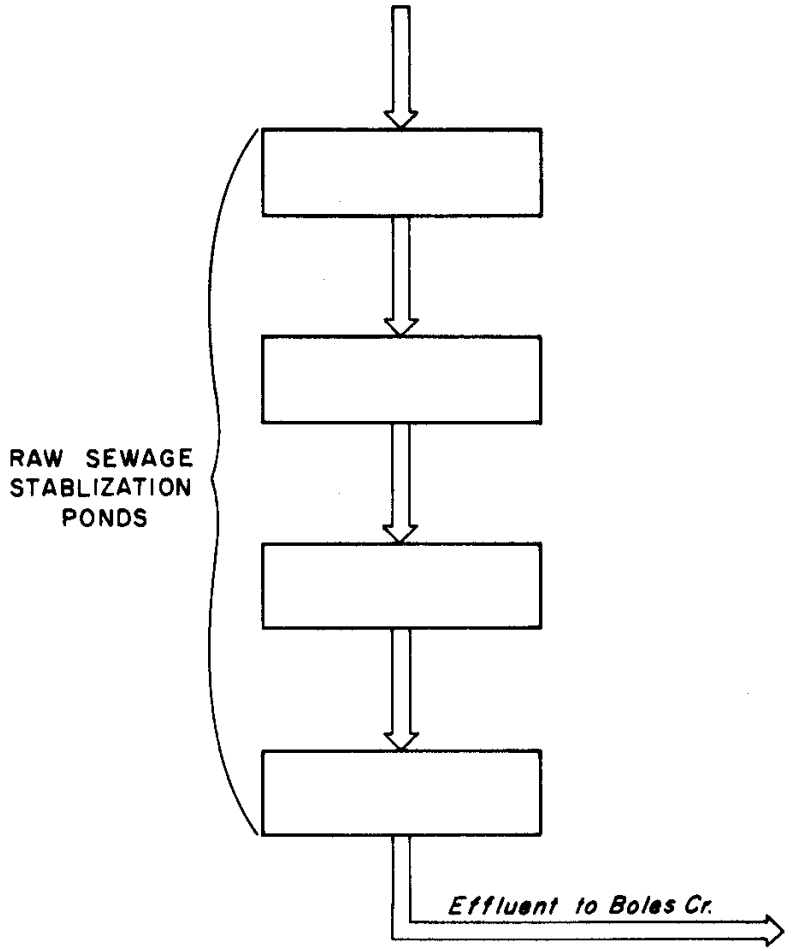
Weed is a city of 4,700 persons in Central Siskiyou County. It is at the junction of U. S. Highway 97 and Interstate 5 at the south end of Shasta Valley. However, the sewerage facilities of the Shastina Sanitary District serves an area of about 2,100 residents. This sewage treatment plant is about two miles west of the town north of Boles Creek, in the SW 1/4 of the SW 1/4 of Section 34, T42N, R5W, MDB&M.

Treatment of the waste water includes four raw sewage stabilization ponds. For the period January 1963 through June 1964, discharges from the waste water treatment facilities averaged 0.24 million gallons per day, or 269 acre-feet per year. As of April 1967, effluent from the plant discharged to Boles Creek. At present, no planned utilization is made of the treated waste water.

Analyses of the effluent from this treatment plant were made in June 1963 and February 1965. Based on these analyses, the quality of the effluent is considered Class 1 for irrigation purposes.

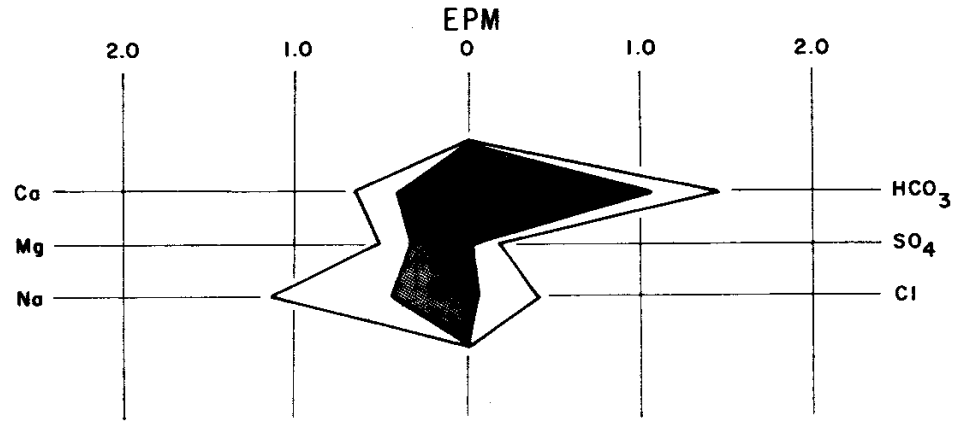
The graph on page 156 compare analyses of the supply water for the year 1952 and of the effluent for June 1963. These analyses indicate that the increments for the major chemical constituents are generally at or less than the median increment values for all sewerage facilities reported herein.

The mineral quality is within the recommended limits of the drinking water standards. The effluent from this treatment plant should be of acceptable quality for most beneficial uses which might develop in the area.



SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

SHASTINA SANITARY DISTRICT - WEED

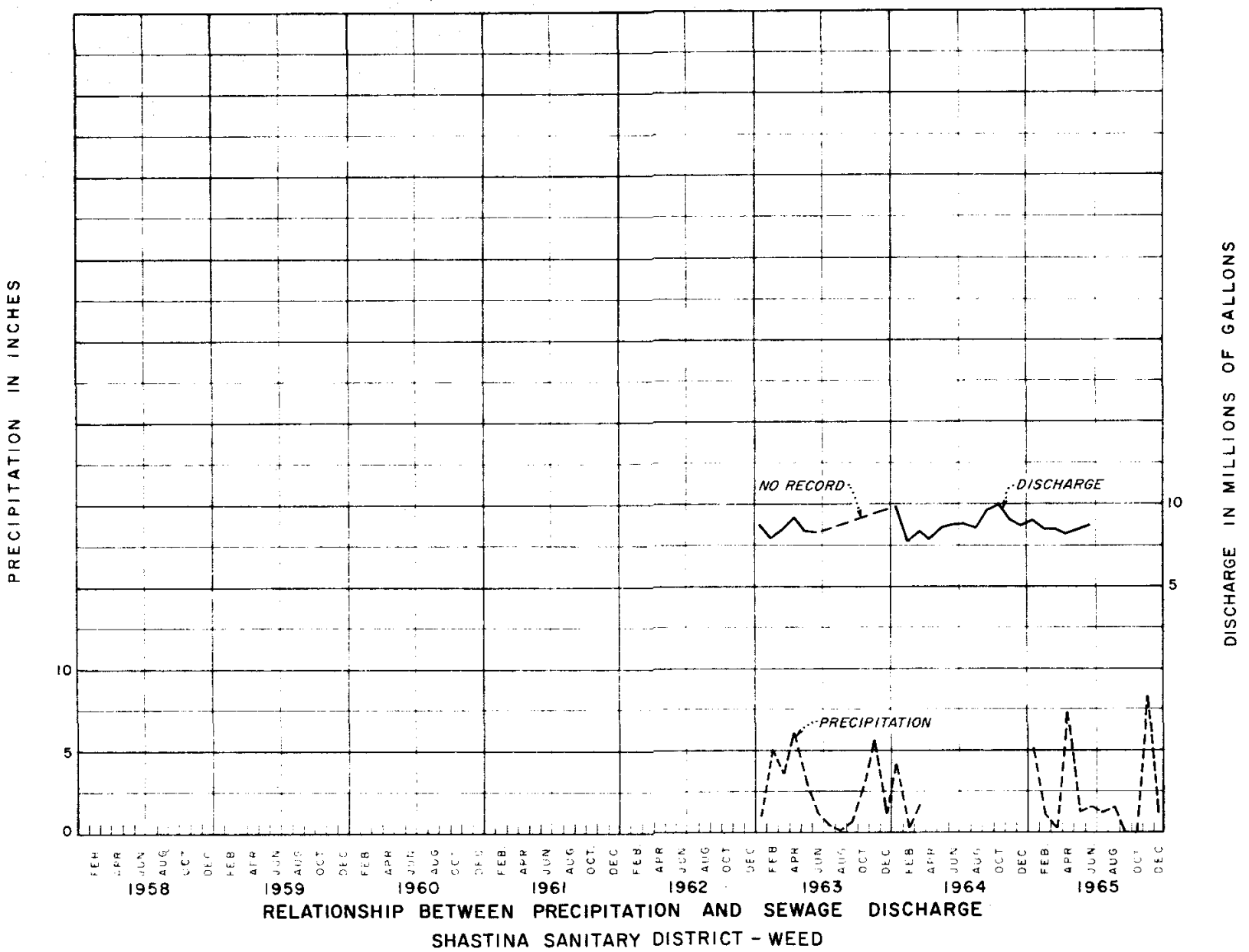


WATER SUPPLY 1952

EFFLUENT JUNE 1963

SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

SHASTINA SANITARY DISTRICT - WEED



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE

SHASTINA SANITARY DISTRICT - WEED

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents — milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm): Total	Hardness as $CaCO_3$ mg/l (ppm): N.C.	Percent Sodium
Weed Shastina Sanitary District																						
Pond #4	6-12-63 1400	Grab	--	7.0 8.9	246	13 0.65	6.2 0.51	26 1.13	6.0 0.15	3.3 0.23	13 0.43	89 1.46	8.9 0.18	15 0.42	0.4 0.01	0.1	0.2 0.01	52	138[a]	58	0	42
Effluent from ponds	2-18-65 1105	Grab	0.23	- 7.0	255	--	--	--	--	--	0 0.00	87 1.42	--	16 0.45	2.4 0.04	--	--	--	196	65	--	--

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Alumi-num (Al)	Ar-senic (As)	Chromi-um (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manga-nese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfact-ants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammo-nia (N)	Ni-trite (N)	Ni-trate (N)	Organic (N)	Ammonia and organic (N)	Ortho phos-phate (PO_4)	Total phos-phate
Weed Shastina Sanitary District																						
Pond #4	6-12-63 1400	Grab	--	--	--	--	--	--	--	--	--	1.8	--	--	--	3.3	--	--	--	--	10	--
Effluent from ponds	2-18-65 1105	Grab	0.23	--	--	--	--	--	--	--	--	2.4	--	--	--	--	--	3.04	--	--	--	12

ANALYSES OF WASTE WATER
PART 3

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (ML/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Weed Shastina Sanitary District										
Pond #4	6-12-63 1400	Grab	--	--	--	--	--	--	99.5±4.3	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Weed Shastina Sanitary District Pond #4	6-12-63 1400	Grab	--	40	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	51	<5.7	<0.29	34	<0.29	2.0	<1.4	<0.57	12	<5.7

CITY OF WILLITS

Willits is a city of 3,500 persons in central Mendocino County. It is on U. S. Highway 101 about 25 miles north of Ukiah. The sewage treatment plant is in the northeast part of Willits adjacent to Broaddus Creek, near Commercial and Lenore Streets, in the NW 1/4 of the NE 1/4 of Section 18, T18N, R13W, MDB&M.

Treatment of the waste water includes barminution, clarification, filtration and oxidation by ponding. For the period July 1956 through June 1965, discharges from the waste water treatment facilities averaged 0.78 million gallons per day or 875 acre-feet per year. The average flow for January through October 1966 was 0.49 million gallons per day or 550 acre-feet per year.

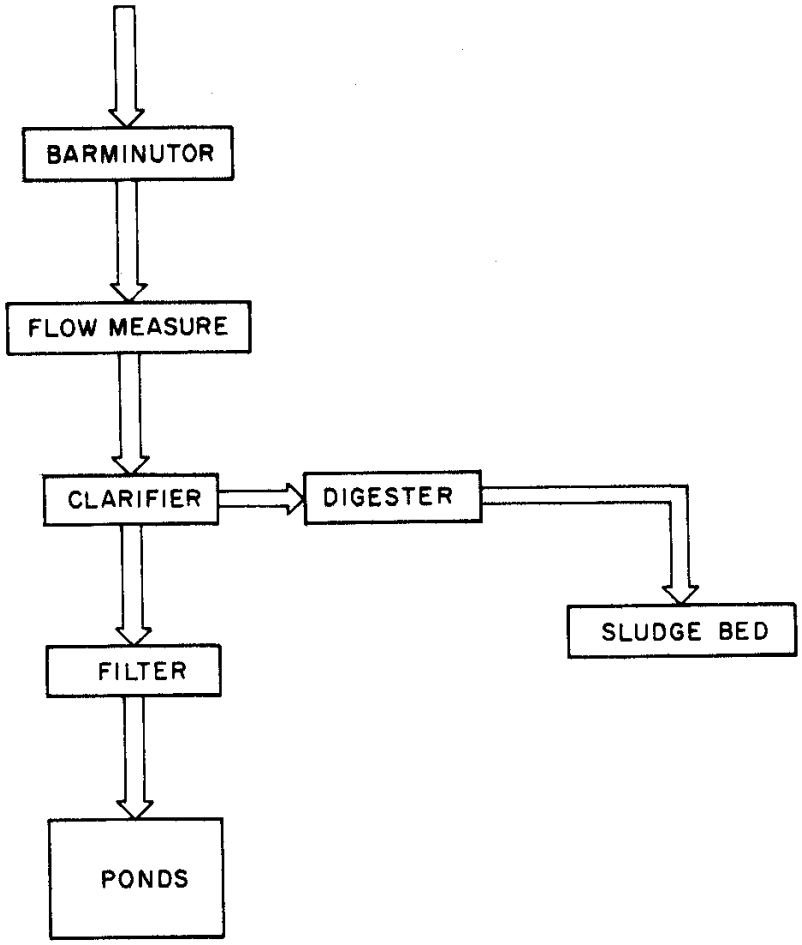
As of April 1967 no direct beneficial use of the effluent was being made. The treated waste water is discharged to Broaddus Creek. The City has shown an interest in utilizing reclaimed water for irrigation of a 27-acre city park.

Analyses of samples of the effluent from the Willits waste water treatment plant were made at periodic intervals from May 1959 through May 1965. Based on these analyses, the quality of the effluent is Class 1 for irrigation purposes.

The graph on page 165 shows a comparison of analyses of the supply water for the year 1962 and of the effluent for August 1962. These analyses indicate that the increase in the major chemical constituents are generally near or below normal for systems in the District.

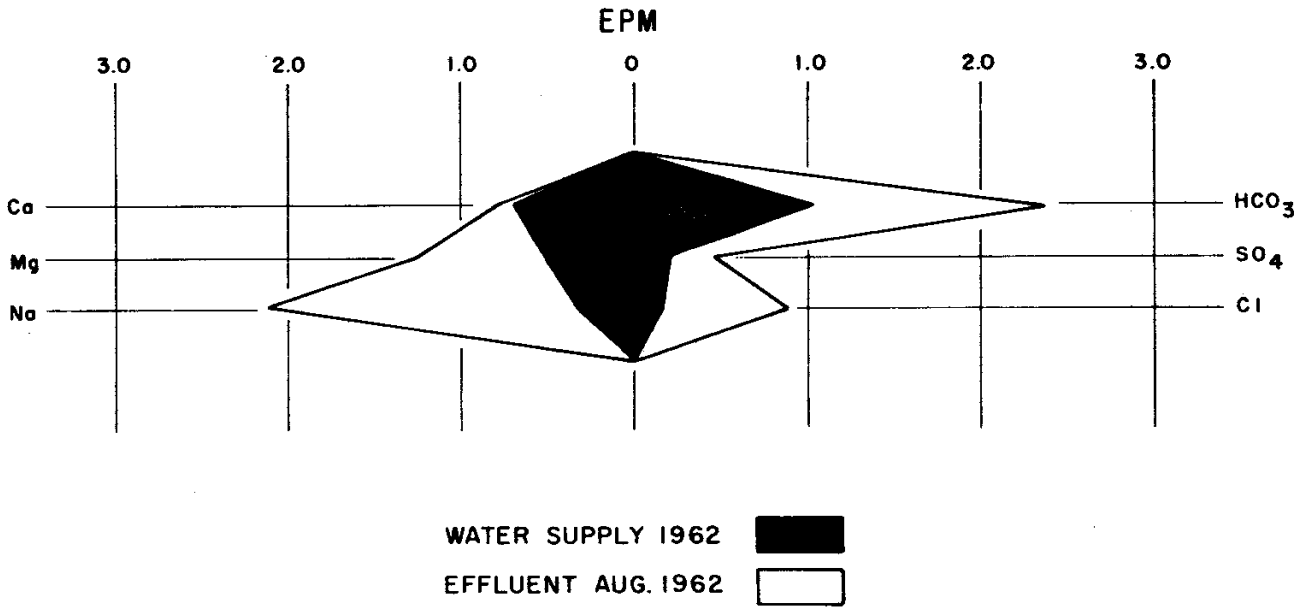
The mineral quality of the Willits plant effluent is within the recommended limits of the drinking water standards. Assuming the present

quality of water can be maintained, there is no reason to believe the reclaimed water could not serve most beneficial uses.



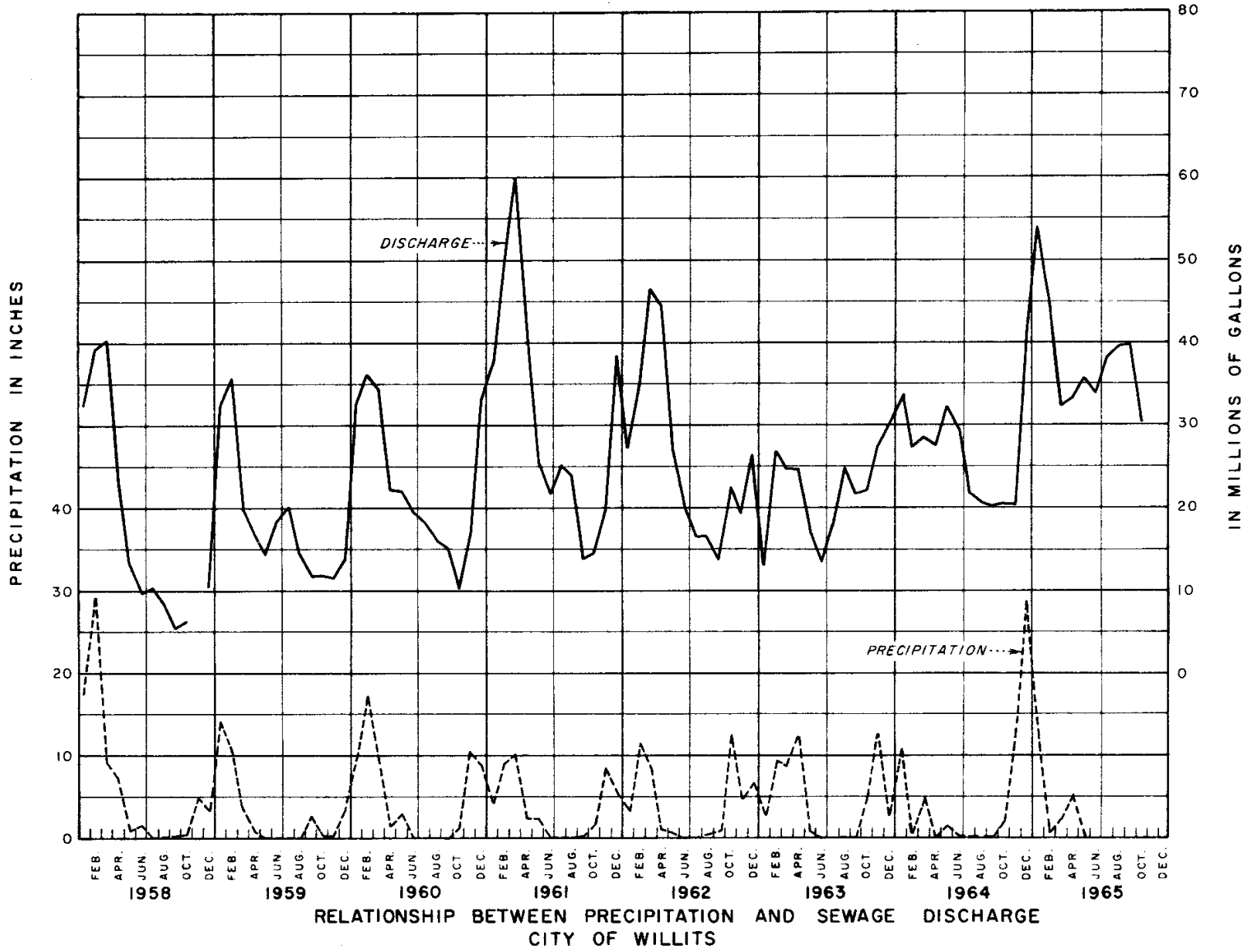
SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF WILLITS



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

CITY OF WILLITS



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF WILLITS

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents (milligrams per liter (ppm) / equivalents per million): Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ mg/l (ppm) N.C.	Percent Sodium
City of Willits																						
Final effluent at discharge	5-14-59 / 8 hr.	Comp.	0.15	- / 8.5	305	14 / 0.70	9.2 / 0.76	35 / 1.52	6.5 / 0.17	1.3 / 0.07	4 / 0.13	110 / 1.80	14 / 0.29	23 / 0.65	6.2 / 0.10	0.26	0.5 / 0.03	21	190[a]	73	0	47
Discharge from Pond #6	5-3-61 / 1600	Grab	--	- / 7.3	275	13 / 0.65	12 / 0.95	21 / 0.91	4.2 / 0.11	2.2 / 0.12	0 / 0.00	108 / 1.77	16 / 0.33	14 / 0.39	9.7 / 0.16	0.2	0.1 / 0.00	14	179	80	0	33
Discharge from Pond #6	8-16-62 / 0800	Grab	0.59	8.4 / 7.5	456	16 / 0.80	15 / 1.24	51 / 2.22	11 / 0.28	5.1 / 0.28	0 / 0.00	145 / 2.38	28 / 0.46	32 / 0.90	19 / 0.31	0.6	0.2 / 0.01	18	263[a]	102	0	46
Discharge from Pond #6	5-6-64 / 1040	Grab	--	7.4 / 7.6	385	14 / 0.70	14 / 1.12	26 / 1.13	5.8 / 0.15	9.8 / 0.54	0 / 0.00	154 / 2.52	25 / 0.52	17 / 0.48	3.0 / 0.05	0.4	--	--	215	91	0	31
Discharge into Pond #1	5-27-65 / 1430	Grab	1.2	7.3 / 9.2	406	9.0 / 0.45	9.8 / 0.81	44 / 1.91	10 / 0.26	--	8 / 0.27	10 / 0.16	43 / 0.90	28 / 0.79	--	0.4	--	--	273	63	42	58
Discharge from Pond #6	5-27-65 / 1500	Grab	1.2	7.2 / 7.6	352	14 / 0.70	13 / 1.10	27 / 1.17	6.2 / 0.16	--	0 / 0.00	64 / 1.05	21 / 0.44	18 / 0.51	--	0.2	--	--	248	90	38	37

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Willits																						
Final effluent at discharge	5-14-59 --	Comp.	0.15	--	--	--	--	--	--	--	--	--	--	--	20	--	--	--	--	--	8.0	--
Discharge from pond #6	5-3-61 1600	Grab	--	--	--	--	--	--	--	--	--	2.0	--	--	9.1	--	--	--	--	--	13	--
Discharge from pond #6	8-16-62 0800	Grab	0.59	--	--	--	--	--	--	--	--	2.4	--	--	--	--	--	--	--	--	--	37
Discharge from pond #6	5-6-64 1040	Grab	--	--	--	--	--	--	--	--	--	2.8	--	--	--	--	--	--	--	--	17	--
Discharge into pond #1	5-27-65 1430	Grab	1.2	--	--	--	--	--	--	--	--	1.9	--	--	--	--	--	0.0	--	[illegible]	--	38
Discharge from pond #6	5-27-65 1500	Grab	1.2	--	--	--	--	--	--	--	--	1.8	--	--	--	--	--	0.0	--	1[illegible]	--	19

NORTH COASTAL REGION NO. 1

ANALYSES OF WASTE WATER
PART 3

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Willits										
Final effluent at discharge	5-14-59 / --	Comp.	0.15	22	--	9.0	0.15±0.26	1.77±4.3	--	
Discharge from Pond #6	5-3-61 / 1600	Grab	--	6	--	2.3	--	--	--	
Discharge from Pond #6	8-16-62 / 0800	Grab	0.59	--	--	--	--	--	9.5±3.5	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Willits																				
Discharge from Pond #6	8-16-62 / 0800	Grab	0.59	<3.3	<1.3	<0.67	<3.3	<3.3	<3.3	<3.3	8.7	<13	<0.67	<3.3	<0.67	<0.67	<3.3	<1.3	<0.67	<13

CITY OF WILLOWS

Willows, the county seat of Glenn County, is a city of 4,500 persons. It is on Interstate Highway 5 and about 10 miles west of the Sacramento River. The sewage treatment plant is about 1 mile south of town, east of old Highway 99W in the NW 1/4 of the SW 1/4 of Section 15, T19N, R3W, MDB&M.

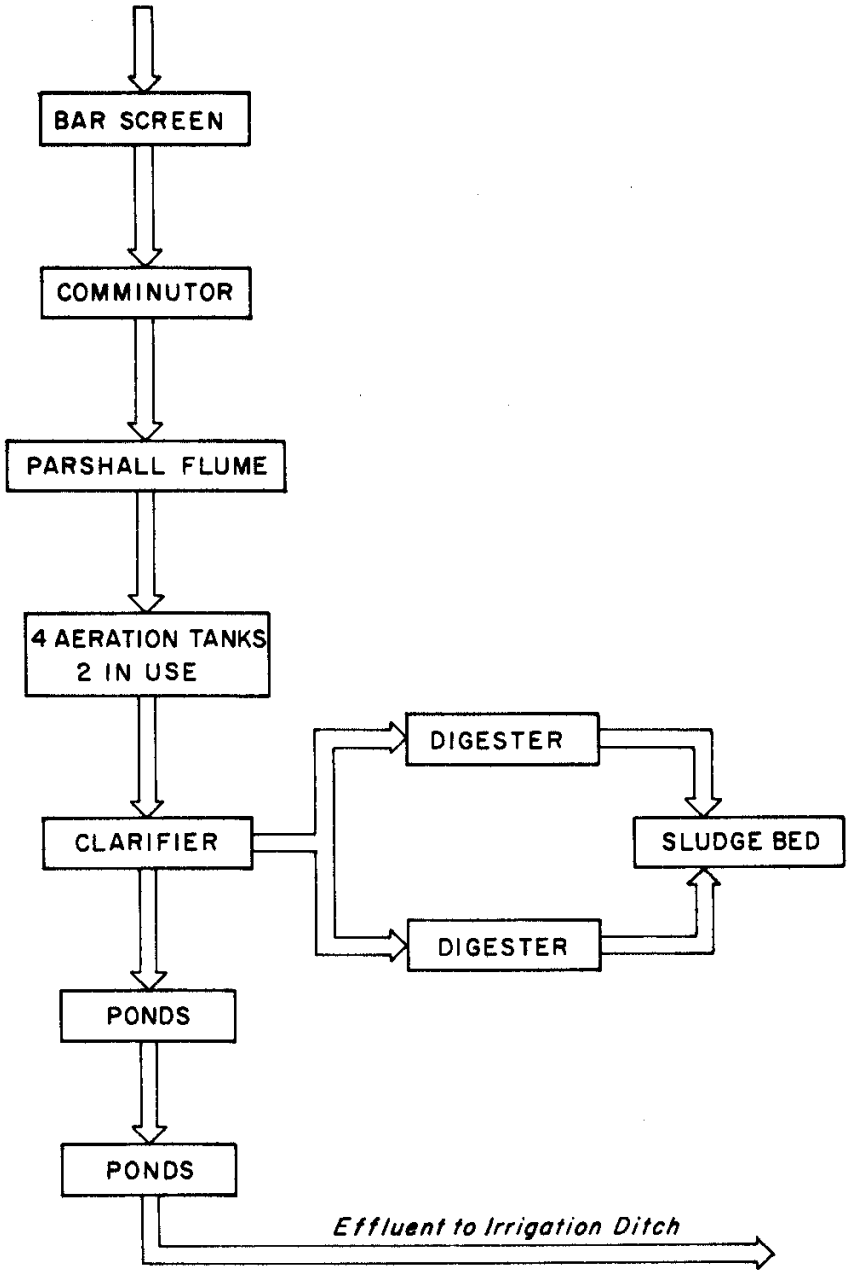
Treatment of the waste water includes screening, comminution, aeration, clarification and ponding. For the period January 1960 through June 1965 discharges from the plant averaged 0.64 million gallons per day or 720 acre-feet per year. For the year 1966, the discharges averaged 0.60 million gallons per day or 670 acre-feet per year. The plant capacity is 0.92 million gallons per day.

As of April 1967 effluent from the pond was comingled with water in the Glenn-Colusa Irrigation District Drain, from which the combined water is used for irrigation of rice fields.

Periodic analyses from July 1960 to April 1965 indicated that effluent from the Willows treatment plant was Class 1 for irrigation purposes.

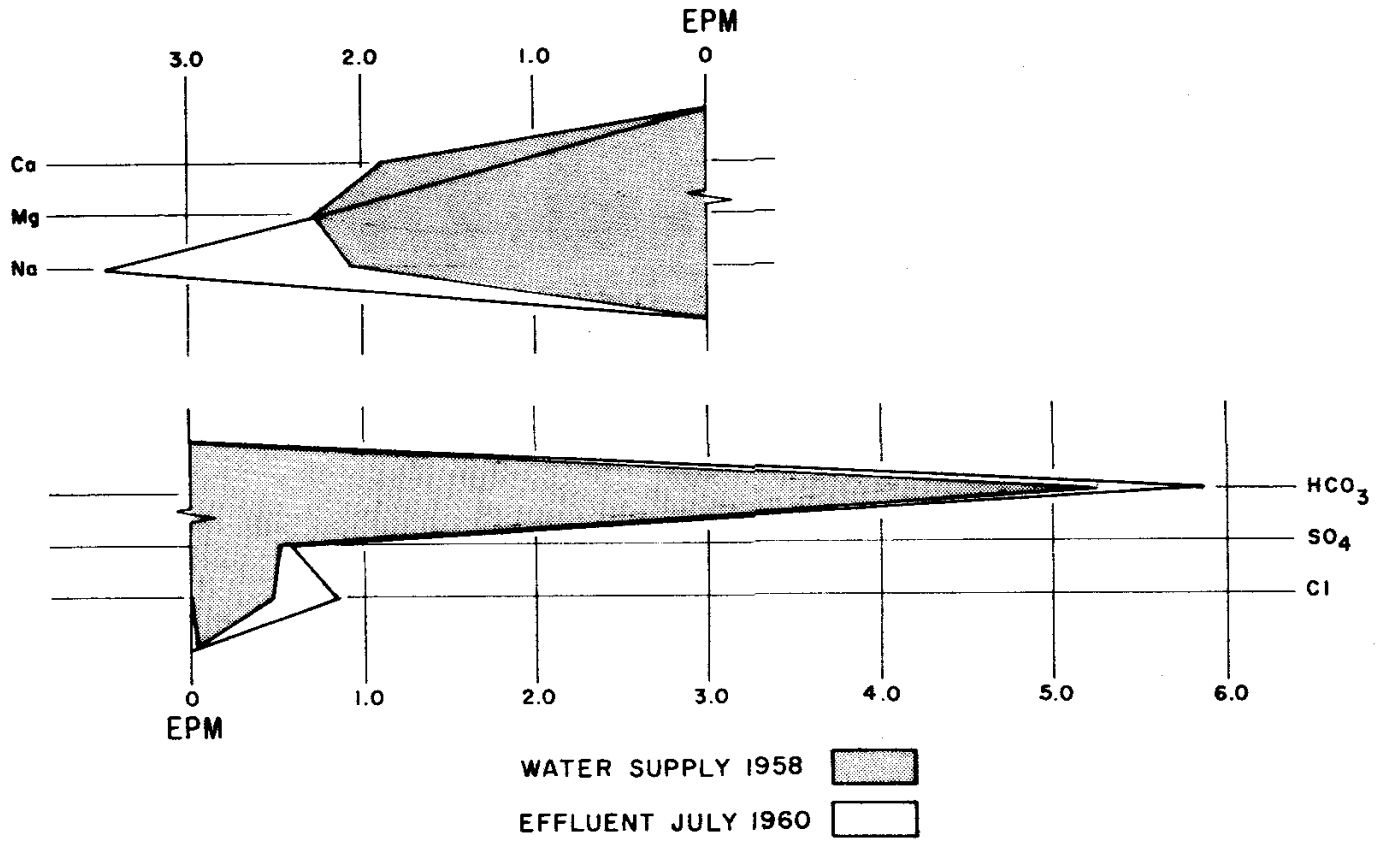
The graph on page 173 compares analyses of the supply water for the year 1958 and of the effluent for July 1960. These analyses indicate that the increments for the major chemical constituents are generally consistent with the increment values for all sewerage facilities considered. The increment for sodium is the only exception, being about twice the norm.

The mineral quality of the effluent is within the recommended limits of the drinking water standards. Assuming the present quality of the treated waste water continues, the practice of irrigation could prevail without creating any adverse effects due to dissolved mineral concentrations.



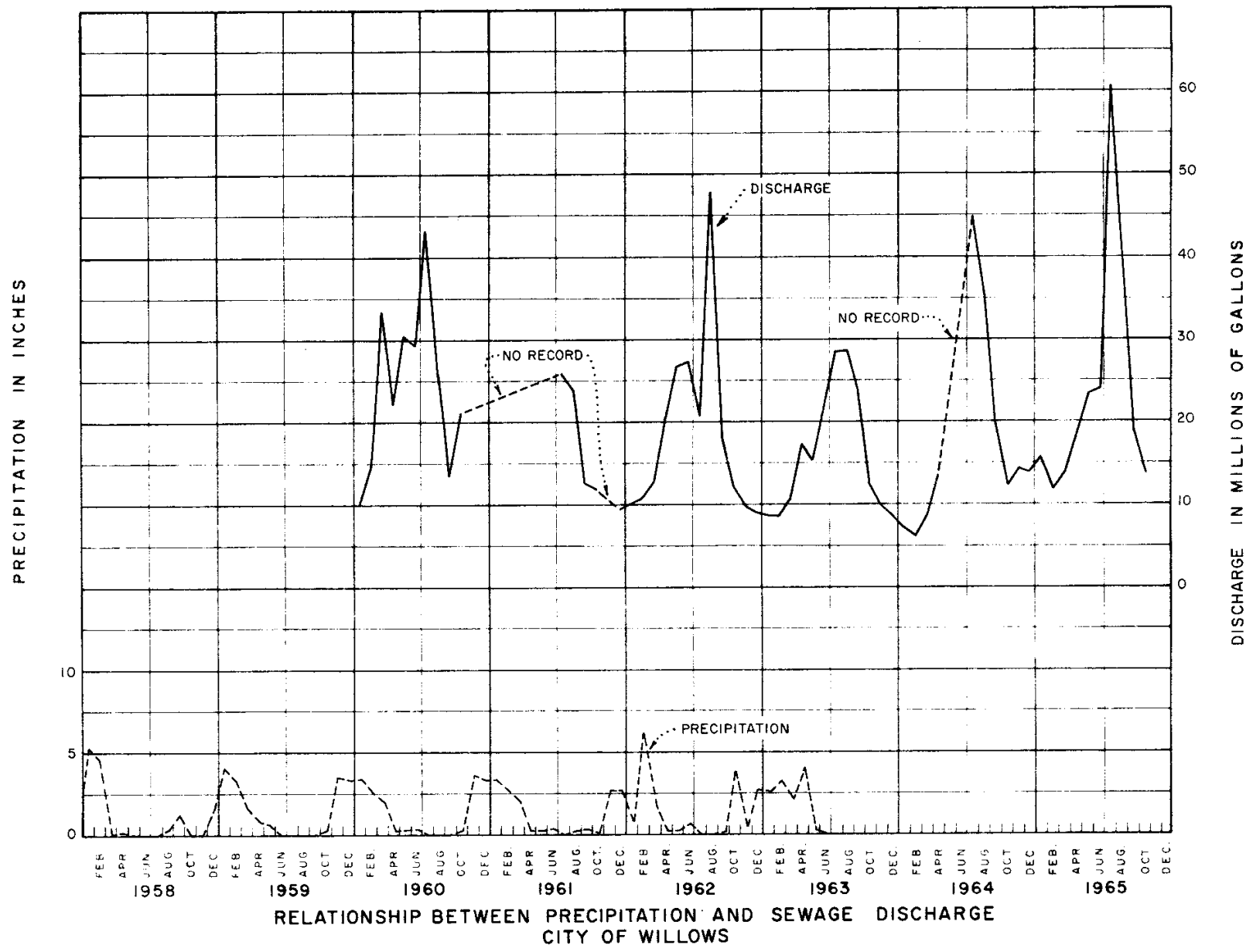
SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

CITY OF WILLOWS



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT

· CITY OF WILLOWS



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
CITY OF WILLOWS

ANALYSES OF WASTE WATER
PART I

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents in milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ (ppm) N.C.	Percent Sodium
City of Willows																						
Pond	7-20-60 / 24 hr	Comp.	--	- / 7.8	676	23 / 1.15	27 / 2.25	80 / 3.48	5.5 / 0.14	5.1 / 0.28	0 / 0.00	357 / 5.85	28 / 0.58	30 / 0.85	0.2 / 0.00	0.3	--	28	408[a]	170	0	48
SE corner of final pond	5-28-63 / 0800	Grab	--	- / 8.2	726	21 / 1.05	25 / 2.03	95 / 4.13	4.9 / 0.12	4.4 / 0.11	0 / 0.00	334 / 5.47	40 / 0.83	38 / 1.07	0.0 / 0.00	0.2	0.0 / 0.00	24	412[b]	154	0	59
SE corner of Pond #2	5-14-64 / 0715	Grab	--	8.4 / 8.2	734	--	--	--	--	--	0 / 0.00	361 / 5.92	--	--	0.2 / 0.00	--	--	--	408	182	--	--
SE corner of Pond #2	1-14-65 / 1000	Grab	0.50	- / 8.0	808	52 / 2.59	10 / 0.83	86 / 3.74	6.8 / 0.17	--	0 / 0.00	370 / 6.06	45 / 0.94	36 / 1.02	1.4 / 0.02	0.4	--	--	447	171	0	51
NW corner of Pond #1	4-8-65 / 1330	Grab	0.54	- / 7.7	854	79 / 3.94	1.2 / 0.10	103 / 4.48	9.6 / 0.24	--	0 / 0.00	377 / 6.18	46 / 0.96	44 / 1.24	0.4 / 0.03	0.6	--	--	534	208	0	51

(a) Sum of analyzed constituents.

CENTRAL VALLEY REGION NO. 5

ANALYSES OF WASTE WATER
PART 2

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
City of Willows																						
Pond	7-20-60 / --	Comp.	--	--	--	--	--	--	--	--	--	--	--	--	14	--	--	--	--	--	15	--
SE corner of final pond	5-28-63 / 0800	Grab	--	--	--	--	--	--	--	--	--	2.5	--	--	--	1.[illegible]	--	--	--	--	1[illegible]	--
SE corner of Pond #2	5-14-64 / 0715	Grab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30
SE corner of Pond #2	1-14-65 / 1000	Grab	0.50	--	--	--	--	--	--	--	--	2.9	--	--	--	8.0	--	--	--	--	[illegible]	[illegible]
NW corner of Pond #1	4-8-65 / 1330	Grab	0.54	--	--	--	--	--	--	--	--	3.3	--	--	--	--	--	0.4	--	14	--	--

ANALYSES OF WASTE WATER
PART 3

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mgd)	Suspended solids (ppm)	Settleable solids (ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
City of Willows										
SE corner of final pond	5-28-63 0800	Grab	--	--	--	--	--	--	3.6±3.0	

SPECTROGRAPHIC ANALYSES OF WASTE WATER

PART 4

CENTRAL VALLEY REGION NO. 5

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Alumi-num (Al)	Beryl-lium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chro-mium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Gg)	Germa-nium (Ge)	Manga-nese (Mn)	Molyb-denum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
City of Willows																				
SE corner of final pond	5-28-63 0800	Grab	--	<1.4	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	6.4	<5.7	<0.29	<1.4	<0.29	<0.29	<1.4	<0.57	15	<5.7

TOWN OF YREKA CITY

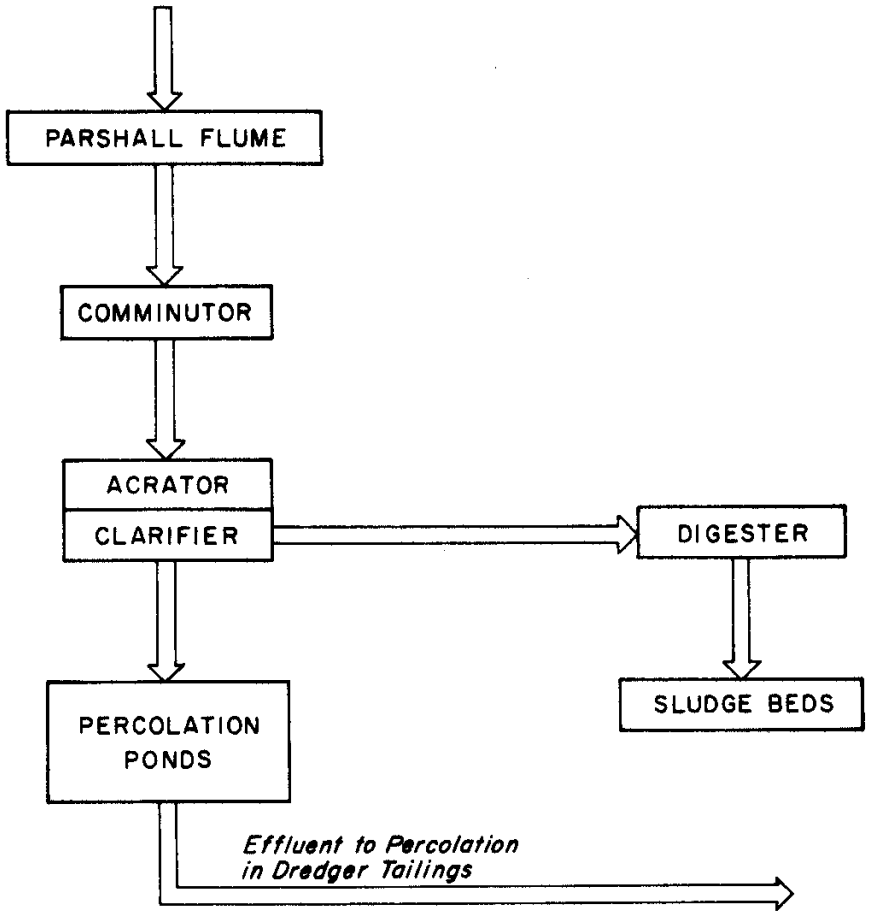
The Town of Yreka, county seat of Siskiyou County, is a city of 5,200 persons. The sewage treatment plant is about one mile north of town between Yreka Creek and U. S. Highway 99 in the SE 1/4 of the SW 1/4 of Section 22, T45N, R7W, MDB&M.

Treatment of the waste water includes comminution, aeration, and clarification. For the period July 1958 through June 1965 discharges from the waste water treatment facilities averaged 0.59 million gallons per day or 660 acre-feet per year based on somewhat questionable measurements. As of April 1967 effluent from the treatment plant was discharged to an area of dredger tailings. There have been overtures for use of reclaimed water, but to date no direct beneficial use is made of the effluent from this plant.

Analyses of the effluent from the Yreka treatment plant collected in June 1963 and February 1965 have been made. Based on analyses of these samples the quality of the effluent is considered Class 1 for irrigation purposes.

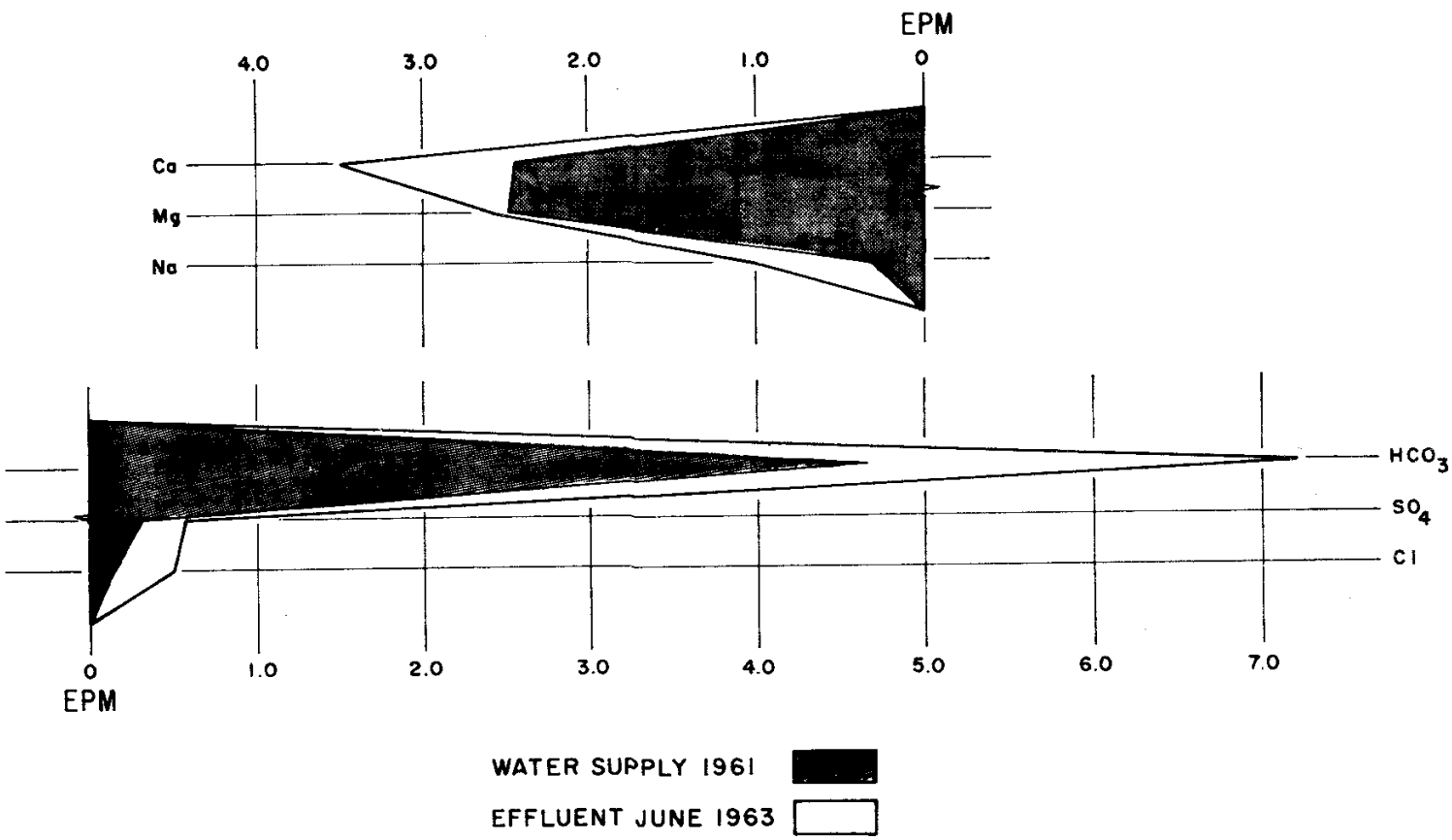
The graph on page 181 shows a comparison of analyses of the supply water for the year 1961 and of effluent for June 1963. These analyses indicate the increases in the concentrations of the major chemical constituents are somewhat erratic. Compared to normal increases shown by all sewerage facilities considered in this report, the increment values for calcium and bicarbonate are high, and those for sodium and chloride are low.

The mineral quality of the effluent from the Yreka plant is within the recommended limits of the drinking water standards. If the existing quality of the effluent continues, it is reasonable to expect the reclaimed water can be used for most purposes without adverse effects.

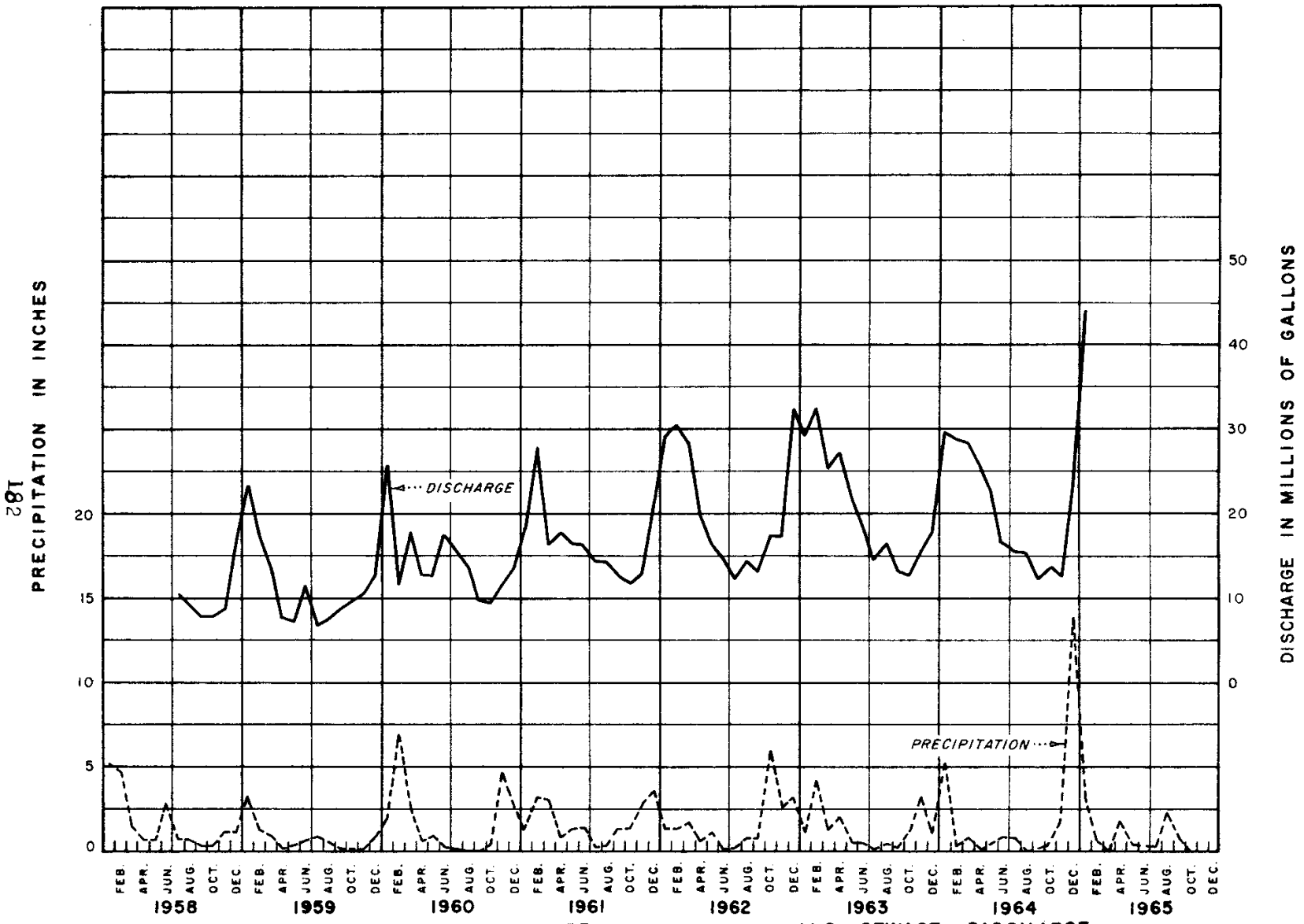


SCHEMATIC OF WASTE WATER
TREATMENT FACILITIES

TOWN OF YREKA



SUPPLY WATER AS COMPARED TO TREATMENT PLANT EFFLUENT
TOWN OF YREKA



RELATIONSHIP BETWEEN PRECIPITATION AND SEWAGE DISCHARGE
TOWN OF YREKA

ANALYSES OF WASTE WATER
PART I

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	pH Field / Lab	Specific conductance (micromhos at 25°C)	Mineral constituents in milligrams per liter (ppm) / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Ammonium (NH_4)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Fluoride (F)	Silica (SiO_2)	T.D.S. mg/l (ppm)	Hardness as $CaCO_3$ mg/l (ppm) Total	Hardness as $CaCO_3$ mg/l (ppm) N.C.	Percent Sodium
Town of Yreka																						
Percolation bed	6-12-63 / 0800	Grab	--	7.6 / 7.8	770	70 / 3.49	31 / 2.56	23 / 1.00	5.8 / 0.15	21 / 1.50	0 / 0.00	440 / 7.21	28 / 0.58	18 / 0.51	0.8 / 0.01	0.0	0.2 / 0.01	30	446[a]	303	0	11
Effluent from clarifier	2-18-65 / 0905	Grab	1.3	- / 8.0	821	--	--	--	--	--	0 / 0.00	439 / 7.20	--	23 / 0.65	2.2 / 0.04	--	--	--	347	272	--	--

(a) Sum of analyzed constituents.

ANALYSES OF WASTE WATER
PART 2

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Heavy Metals mg/l (ppm)								Organics mg/l (ppm)				Nutrients mg/l (ppm)						
				Aluminum (Al)	Arsenic (As)	Chromium (Hex) (Cr^{+6})	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Zinc (Zn)	Total iron (Fe)	Surfactants (apparent) ABS	Grease and oil	Phenolic material (C_6H_5OH)	BOD (5 day)	Ammonia (N)	Nitrite (N)	Nitrate (N)	Organic (N)	Ammonia and organic (N)	Ortho phosphate (PO_4)	Total phosphate
Town of Yreka																						
Percolation bed	6-12-63 0800	Grab	--	--	--	--	--	--	--	--	--	1.2	--	--	--	21	--	--	--	--	7.9	--
Effluent from clarifier	2-18-65 0905	Grab	1.3	--	--	--	--	--	--	--	--	1.3	--	--	--	--	--	0.5	--	--	--	13

ANALYSES OF WASTE WATER
PART 3

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (PST)	Type of Sample	Flow (mg d)	Suspended solids (ppm)	Settleable solids (Ml/L)	Ether solubles (ppm)	Radioactivity			Remarks
							Alpha	Beta	Gross	
Town of Yreka										
Percolation bed	6-12-63 / 0800	Grab	--	--	--	--	--	--	5.7±3.7	

SPECTROGRAPHIC ANALYSES OF WASTE WATER
PART 4

NORTH COASTAL REGION NO. 1

Source	Date / Time Sampled (P S T)	Type of Sample	Flow (mgd)	Constituents in parts per billion																
				Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
Town of Yreka																				
Percolation bed	6-12-63 / 0800	Grab	--	4.3	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	24	<5.7	<0.29	41	<0.29	4.0	<1.4	<0.57	4.3	<5.7

APPENDIX A

WATER QUALITY CRITERIA

APPENDIX A - WATER QUALITY CRITERIA

Criteria presented in the following sections can be utilized in evaluating mineral quality of water relative to existing or anticipated beneficial uses. It should be noted that these criteria are merely guides to the appraisal of water quality. Except for those constituents, which are considered toxic to human beings, these criteria should be considered as suggested limiting values. A water which exceeds one or more of these limiting values need not be eliminated from consideration as a source of supply, but other sources of better quality water should be investigated.

Domestic and Municipal Water Supply

The following tablulation gives the limiting concentrations of mineral constituents for drinking water, as prescribed by the United States Public Health Service.

UNITED STATES PUBLIC HEALTH SERVICE
DRINKING WATER STANDARDS
1962

Constituent	Mandatory Limit in ppm
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Hexavalent chromium (Cr^{+6})	0.05
Cyanide (CN)	0.2
Lead (Pb)	0.05
Selenium (Se)	0.01
Silver (Ag)	0.05

Constituent	Nonmandatory, but recommended limit
Alkyl benzene sulphonate (detergent)	0.5
Arsenic (As)	0.01
Carbon chloroform extract (exotic organic chemicals)	0.2
Chloride (Cl)	250
Copper (Cu)	1.0

UNITED STATES PUBLIC HEALTH SERVICE
DRINKING WATER STANDARDS
1962 (Continued)

Constituent	Nonmandatory, but recommended limit
Cyanide (CN)	0.01
Fluoride (F)	1.7
Iron (Fe)	0.3
Manganese (Mn)	0.05
Nitrate (NO_3)	45
Phenols	0.001
Sulfate (SO_4)	250
Total dissolved solids	500
Zinc (Zn)	5

In addition, the United States Public Health Service recently announced limits on concentrations of radioactivity in drinking waters. These limits are as follows:

Radionuclide	Recommended maximum limit micromicrocuries per liter
$Radium^{226}$	3
$Strontium^{90}$	10
Gross beta activity	1,000*

* In the known absence of $strontium^{90}$ and alpha emitters

Interim standards for certain mineral constituents have recently been adopted by the California State Board of Public Health. Based on these standards, temporary permits may be issued for drinking water supplies failing to meet the United States Public Health Service Drinking Water Standards, provided the mineral constituents in the following table are not exceeded.

UPPER LIMITS OF TOTAL SOLIDS AND SELECTED MINERALS IN
DRINKING WATER AS DELIVERED TO THE CONSUMER

	Permit	Temporary Permit
Total solids	500 (1000)**	1500 ppm
Sulfates (SO_4)	250 (500) **	600 ppm
Chlorides (Cl)	250 (500) **	600 ppm
Magnesium (Mg)	125 (125)	150 ppm

** Numbers in parentheses are maximum permissible, to be used only where no other more suitable waters are available in sufficient quantity for use in the system.

The California State Board of Public Health has defined the maximum safe amounts of fluoride ion in drinking water in relation to mean annual temperature.

Mean annual temperature	Mean monthly fluoride ion concentration
50°F	1.5 ppm
60°F	1.0 ppm
70°F - above	0.7 ppm

Even though hardness of water is not included in the above standards, it is of importance in domestic and industrial uses. Excessive hardness in water used for domestic purposes causes increased consumption of soap and formation of scale in pipe and fixtures. The following tabulation for degrees of hardness is commonly used and provides a convenient system of classification:

Range of Hardness, expressed as $CaCO_3$, in ppm	Relative classification
0 - 100	Soft
101 - 200	Moderately hard
Greater than 200	Usually requires softening

Industrial Water Supply

Water quality criteria for industrial waters are as varied and diversified as industry itself. Food processing, beverage production, pulp and paper manufacturing, and textile industries have exacting requirements. However, cooling or metallurgical operations permit the use of poor quality waters. In general, where a water supply meets drinking water standards, it is satisfactory for industrial use, either directly or following a limited amount of polishing treatment by the industry.

Irrigation Water

Criteria for mineral quality of irrigation water have been developed by the Regional Salinity Laboratories of the United States Department of

Agriculture in cooperation with the University of California. Because of diverse climatological conditions and the variation in crops and soils in California, only general limits of quality for irrigation waters can be suggested.

QUALITATIVE CLASSIFICATION OF IRRIGATION WATERS

Chemical properties	Class 1 Excellent to good	Class 2 Good to Injurious	Class 3 Injurious to Unsatisfactory
Total dissolved solids, in ppm	Less than 700	700 - 2000	More than 2000
Conductance, in micromhos at 25°C	Less than 1000	1000 - 3000	More than 3000
Chlorides in ppm	Less than 175	175 - 350	More than 350
Sodium in percent of base constituents	Less than 60	60 - 75	More than 75
Boron in ppm	Less than 0.5	0.5 - 2.0	More than 2.0

These criteria have limitations in actual practice. In many instances a water may be wholly unsuitable for irrigation under certain conditions of use, and yet be completely satisfactory under other circumstances. Consideration also should be given to soil permeability, drainage, temperature, humidity, rainfall, and other conditions that can alter the response of a crop to a particular quality of water.

APPENDIX B

BIBLIOGRAPHY OF RELATED REPORT

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